THE BRITISH JOURNAL

OF

OPHTHALMOLOGY

SEPTEMBER, 1929

## COMMUNICATIONS

### SOME EXPERIMENTS ON EYE MOVEMENTS

BY

D. E. CORKILL AND

R. J. LYTHGOE *(Beit Memorial Research Fellow)*

FROM THE DEPARTMENT OF PHYSIOLOGY AND BIOCHEMISTRY, UNIVERSITY COLLEGE, LONDON

*Introductory.*—The experiments were devised with a view to finding the times taken, under different conditions, for a subject to move his eyes from the position in which he was fixating a point to another in which he could see a test-object, certain details of which he had to read.

The subject sat facing a large white screen in which four windows were cut. A small source of light behind a narrow slit in the screen served as the fixation point, and it was situated at the centre of the circle on which the windows lay. After the subject was comfortably seated and was looking at the fixation point, a warning signal was given and the letter C was exposed in one of the windows, that is to the right, left, above, or below the fixation point. Immediately he was aware of the light he moved his eyes towards the window in which it appeared and endeavoured to recognise the direction in which the letter was pointing.

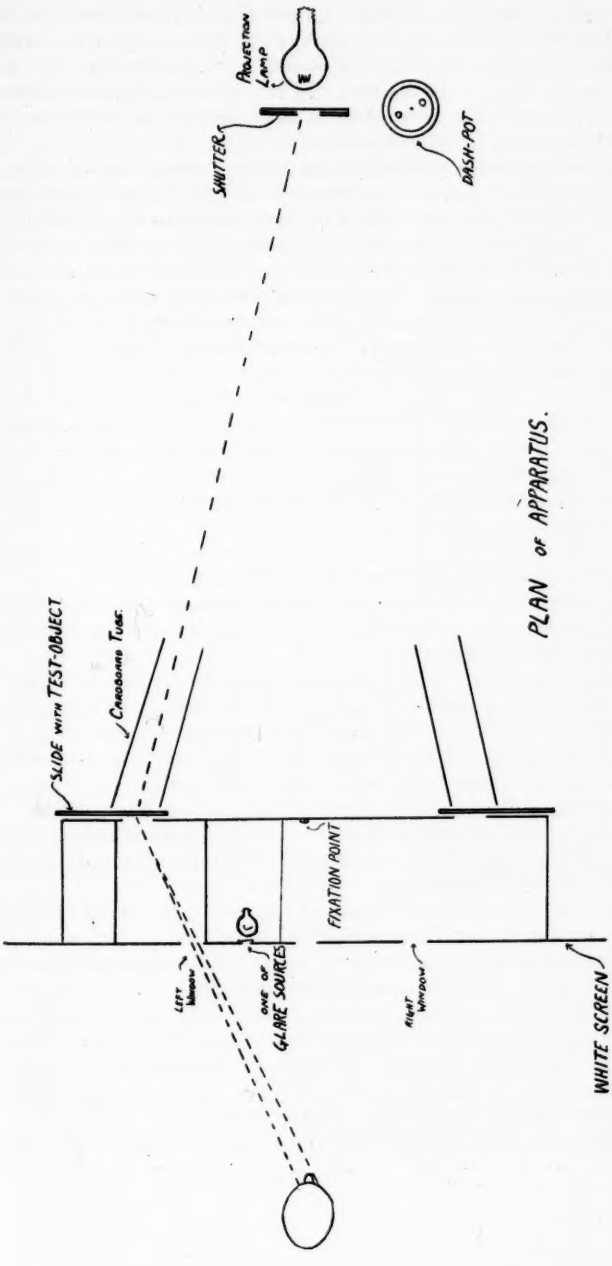
The method used was to determine the number of mistakes made when the duration of the exposure was varied. Comparison of the number of mistakes made at the four windows with the same length of exposure was used to determine the relative times taken by the

subjects to move their eyes in different directions. We were anxious to find whether " glaring " sources of light in the field of vision had any influence on the results. At the instant at which the subject became aware of the light in one of the windows it would act as a stimulus to him to move his eyes towards that window. If at the same time another source of light was present in the field of vision, it was thought that it might act as another stimulus for fixation, the two stimuli competing for the subject's attention.* Unfortunately our evidence on this point was negative; the increase in time taken by the subject to perform the task could be accounted for in other ways.

*Apparatus.*—The white screen used in the experiments measured about 1 metre square and the subject sat with his eyes 46 cm. from its centre and with his chin on a fixed support. The brightness of the screen was maintained at 1.5 equivalent foot-candles by two gas-filled lamps placed so as to be out of the field of vision and to cast no shadows. Four windows, 3.8 cm. by 2.5 cm., were cut in the screen with their centres on a circle of 16.5 cm. radius, and at the centre of this circle was a horizontal slit 2.5 cm. long through which the fixation point was visible.

The test-object used was the Landolt broken circle (C) printed from a photographic negative in black on a transparent ground. The diameter of the C was 0.524 cm. and the breadth of the gap was 0.108 cm., the latter subtending an angle of 4.7 minutes to the eye. Four positions of the letter C (right, left, up and down) were printed on a slide which was bound up with ground glass and moved in runners fixed on the side of a box opposite to that on which the white screen was attached. The depth of the box was 23 cm. The subject looking through any one window in the screen could see only one position of the letter and could see it with both eyes. The slides could be illuminated from behind, at a distance of about a metre, by a 100 volt, 100 watt gas-filled projection lamp mounted behind an opening in a wooden screen. The exposure was made by a falling shutter counterpoised by means of pulleys by a weight moving in an oil dash-pot, which kept the velocity of the shutter constant. The shutter consisted of a sheet of zinc in which was a large aperture partially covered by two other pieces of zinc sliding vertically and allowing variations in the size of the aperture. The times of exposure used were 32, 30, 27, 24, 21, 19, 16, hundredths of a second. The timing of the shutter was checked from time to time by fixing a strip of blackened paper to the shutter and causing a

* Man's interest in light is well known; the advertiser, for instance, may flood-light a shop-window or exhibit arresting sky-signs; babies will look towards bright lights before other visual stimuli are effective; finally, motorists, at night, often find it difficult to avoid looking at the headlights of approaching cars. See also Loeb " Forced Movements, etc.," *Phil.*, 1918, p. 127.




PLAN OF APPARATUS.

FIG. 1.

tuning fork to write on it during its fall. The filament of the projection lamp was small so that the cut-off was sharp, the C being fully illuminated for practically the whole of its exposure in a window. During its fall the shutter did not accelerate, except during the first fraction of a second; the duration of an exposure was therefore the same for all windows.

When an exposure was made the subject saw a black letter on a circular ground (whose brightness was 5.15 equivalent foot-candles), the latter being framed in the rectangular aperture of the screen. Cardboard cylinders were fastened behind the four openings at the back of the box to prevent illumination of the slides from extraneous sources which might otherwise have indicated to the subject the window in which the exposure would be made. In addition, the slides were made to run quietly so that the subject could not hear them being moved.

For the investigation of the effects of glare, circular holes, 1.3 cm. in diameter, were bored in the white screen. At the back of each hole was a piece of ground glass and immediately behind this was a gas-filled lamp. When the glare was not in use the holes in the screen were plugged. The positions of the glaring sources were as follows:

*Series A. Glare Inside Left:* (I.L.) half-way along a straight line between the fixation point and the left window.

*Glare Left Top* (L.T.); at the same distance from the fixation point as glare inside left and on a line bisecting the angle between the top and left windows.

*Glare Outside Left* (O.L.) was 20° outside the left window. It was brighter than the other glare sources and was formed by a naked 60 watt opal gas-filled lamp (diameter exposed = 5.5 cm.).

*Series B. Glare Inside Right* (I.R.) half-way along a straight line between the fixation point and the right window.

*Glare Down Right* (D.R.) immediately below glare right.

*Glare Outside Right* (O.R.); on the same horizontal line as "glare inside right" but on the opposite side of and at the same distance from the window.

With the exception of Glare O.L., any one of these glaring sources produced an illumination at the subject's eye of 0.6 foot-candles (measured by a lumeter). Glare O.L. produced an illumination at the subject's eye of 15 foot-candles.

*Method.*—Before taking readings, the subject was adapted to the brightness of the screen for from 5 to 10 minutes. During this time he sat facing the screen and adjusted the position of the chin-rest, so that by moving his eyes, and with the windows open, he could see any of the letters C or the fixation point with both eyes. The windows were then closed and the subject focussed the fixation point.

The experimenter set the aperture in the shutter and pulled out a slide to put one of the C's into position. The signal " ready " was then given and immediately the shutter was released and the exposure made.

The subject moved his eyes as quickly as possible from the fixation point to the window where the exposure was made and endeavoured to read the position of the letter. He then announced what he saw and the result was recorded by the experimenter. This operation was repeated until the four positions of the letter had been shown in each window. The order in which the exposures were to be made was determined by writing each of the 16 positions (4 windows and 4 positions of the letter) on a separate card and the cards were shuffled before each set of readings. The set was repeated for each glare source in turn, a two minutes' rest pause being allowed so as not to tire the subject unduly and to allow the eye to recover from after-images. At least three exposure times were investigated in this way on each day, starting with the largest on one day and the smallest on the next.

In series B, which was taken after the subjects were practised, a table of twelve permutations of the four conditions, no glare, glares I.R., O.R., and D.R. was drawn up and followed from day to day.

*Results.*—The collected results for each one of the six subjects are given in Tables I A—B and Fig. 2. The number of correct answers is given as a percentage, although in most cases less than 100 readings were taken for each window and for each set of conditions. They are arranged to show: (1) the effect of the length of exposure of the letter on the ease with which it could be read, (2), the relative ease with which eye movements in different directions could be made, and (3) the effect of different positions of the " glare " source on the subject's ability to read the letter in any one window. These three sets of data will be considered separately.

1. The effect of the duration of the exposure on the performance of the task is very marked in the case of the subjects D.C., M.K., R.L., and F.W. This is well seen in R.L.'s results for the readings in the right window (Series B, no glare) where shortening the time of exposure from 0.30 to 0.24 secs. (20 per cent.) lowers the number of correct answers from 91.5 per cent. to 40 per cent. (a fall of 55 per cent.).* The remaining two subjects, P.H. and S.M.,

* It is probable that this drop is really more marked than appears at first sight, since if the subject were to guess the direction in which the " C " pointed, making no effort at all to read it, he would, in the long run, guess 25 per cent. of the exposures correctly there being only four possible positions of the letter in one window. If during the experiment he got 60 per cent. wrong answers in a series, 20 per cent. of the correct answers would have been made by guesswork and this figure should be deducted from the 40 per cent. which he appeared to read correctly. On this basis R.L.'s apparent fall in performance from 91.5 to 40 per cent. would be more correctly represented by a fall from 88.7 to 20 per cent.

## TABLE Ia

Showing the effect of (1) Duration of exposure; (2) Position of the "glare" source on the percentage number of correct answers in the reading of the test-object at each window. (Series A.)

The number of readings from which the percentage is calculated is given at the beginning of each line (No. of exposures.)

| Subject. | Number of exposures. | Duration of exposure in secs. | WINDOW. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Right. | | Left. | | Top. | | Bottom. | |
| | | | No glare. | Glare inside left. | No glare. | Glare inside left. | No glare. | Glare inside left. | No glare. | Glare inside left. |
| D.C. ... | 44 | 0.27 | 87 | 93 | 93 | 57 | 59 | 66 | 91 | 84 |
| | 44 | 0.24 | 80 | 80 | 73 | 25 | 30 | 34 | 80 | 70 |
| | 44 | 0.21 | 56 | 30 | 56 | 13 | 17 | 14 | 64 | 42 |
| | 44 | 0.19 | 21 | 18 | 40 | 32 | 5 | 9 | 14 | 19 |
| P.H. ... | 84 | 0.27 | 83 | 83 | 74 | 61 | 76 | 75 | 88 | 89 |
| | 84 | 0.24 | 74 | 82 | 68 | 57 | 70 | 70 | 89 | 74 |
| | 80 | 0.21 | 66 | 56 | 60 | 45 | 64 | 59 | 65 | 69 |
| | 80 | 0.19 | 69 | 68 | 61 | 48 | 59 | 63 | 60 | 53 |
| | 76 | 0.16 | 61 | 61 | 59 | 57 | 58 | 58 | 69 | 59 |
| M.K. ... | 60 | 0.27 | 95 | 99 | 99 | 99 | 89 | 80 | 89 | 91 |
| | 100 | 0.24 | 93 | 94 | 94 | 86 | 58 | 65 | 78 | 79 |
| | 124 | 0.21 | 86 | 88 | 90 | 61 | 33 | 32 | 61 | 56 |
| | 128 | 0.19 | 74 | 63 | 72 | 48 | 24 | 27 | 54 | 46 |
| | 76 | 0.16 | 44 | 45 | 55 | 54 | 16 | 15 | 23 | 23 |
| S.M. ... | 52 | 0.24 | 86 | 77 | 83 | 79 | 71 | 77 | 69 | 62 |
| | 56 | 0.21 | 79 | 72 | 73 | 72 | 64 | 73 | 66 | 45 |
| | 68 | 0.19 | 68 | 77 | 47 | 69 | 75 | 74 | 47 | 62 |
| | 60 | 0.16 | 69 | 62 | 42 | 64 | 80 | 77 | 45 | 49 |
| F.W. ... | 20 | 0.27 | 100 | 97 | 95 | 42 | 90 | 50 | 100 | 94 |
| | 32 | 0.24 | 75 | 93 | 72 | 43 | 44 | 36 | 81 | 86 |
| | 32 | 0.21 | 88 | 78 | 69 | 28 | 19 | 22 | 84 | 69 |
| | | | No glare. | Glare left top. | No glare. | Glare left top. | No glare. | Glare left top. | No glare. | Glare left top. |
| D C. ... | 44 | 0.27 | 93 | 91 | 95 | 93 | 73 | 91 | 89 | 93 |
| | 68 | 0.24 | 82 | 88 | 85 | 82 | 44 | 33 | 85 | 85 |
| | 52 | 0.21 | 63 | 68 | 62 | 66 | 12 | 18 | 50 | 59 |
| | 48 | 0.19 | 46 | 33 | 44 | 44 | 24 | 19 | 40 | 30 |
| P.H. ... | 48 | 0.27 | 85 | 77 | 58 | 69 | 67 | 67 | 83 | 69 |
| | 60 | 0.24 | 83 | 83 | 72 | 53 | 62 | 53 | 53 | 62 |
| | 56 | 0.19 | 61 | 80 | 45 | 48 | 57 | 52 | 55 | 47 |
| | 62 | 0.16 | 88 | 73 | 56 | 62 | 52 | 48 | 56 | 50 |

TABLE 1A—*continued.*

| Subject. | Number of exposures. | Duration of exposures in secs. | WINDOW. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Right. | | Left. | | Top. | | Bottom. | |
| | | | No glare. | Glare left top. | No glare. | Glare left top. | No glare. | Glare left top. | No glare. | Glare left top. |
| M.K. ... | 84 | 0.24 | 95 | 99 | 96 | 99 | 66 | 61 | 88 | 84 |
| | 116 | 0.21 | 93 | 88 | 89 | 83 | 38 | 34 | 61 | 62 |
| | 84 | 0.19 | 67 | 69 | 52 | 66 | 26 | 31 | 60 | 32 |
| | 52 | 0.16 | 40 | 57 | 60 | 43 | 38 | 16 | 27 | 27 |
| F.W. ... | 40 | 0.27 | 98 | 100 | 98 | 100 | 85 | 66 | 98 | 91 |
| | 64 | 0.24 | 91 | 79 | 78 | 77 | 42 | 43 | 85 | 86 |
| | 48 | 0.21 | 63 | 69 | 63 | 57 | 6 | 4 | 54 | 68 |
| | 48 | 0.19 | 33 | 22 | 23 | 28 | 2 | 6 | 28 | 22 |
| | | | No glare. | Glare outside left. | No glare. | Glare outside left. | No glare. | Glare outside left. | No glare. | Glare outside left. |
| D.C. ... | 80 | 0.27 | 88 | 93 | 93 | 84 | 50 | 40 | 80 | 66 |
| | 80 | 0 24 | 73 | 66 | 69 | 58 | 28 | 23 | 56 | 45 |
| | 80 | 0.21 | 43 | 34 | 43 | 39 | 15 | 15 | 28 | 20 |
| | 80 | 0.19 | 19 | 26 | 41 | 24 | 8 | 8 | 21 | 15 |
| S.M. ... | 116 | 0.27 | 77 | 82 | 88 | 87 | 80 | 80 | 77 | 72 |
| | 140 | 0.24 | 82 | 81 | 79 | 77 | 77 | 77 | 69 | 66 |
| | 136 | 0.21 | 75 | 68 | 81 | 71 | 79 | 79 | 54 | 51 |
| | 144 | 0.19 | 73 | 69 | 66 | 63 | 75 | 71 | 51 | 54 |
| | 128 | 0.16 | 65 | 60 | 72 | 58 | 66 | 76 | 54 | 52 |
| | | | No glare. | Glare right. | No glare. | Glare right. | No glare. | Glare right. | No glare. | Glare right |
| P.H. ... | 64 | 0.27 | 80 | 56 | 69 | 58 | 72 | 66 | 64 | 69 |
| | 64 | 0.24 | 66 | 59 | 66 | 56 | 67 | 55 | 58 | 64 |
| | 64 | 0.21 | 70 | 50 | 66 | 66 | 56 | 66 | 48 | 49 |
| | 64 | 0.19 | 56 | 52 | 66 | 58 | 64 | 52 | 52 | 50 |
| | 60 | 0.16 | 58 | 48 | 62 | 56 | 55 | 52 | 43 | 45 |
| M.K. ... | 48 | 0.27 | 90 | 67 | 100 | 94 | 73 | 79 | 86 | 86 |
| | 52 | 0.24 | 87 | 52 | 92 | 87 | 65 | 39 | 71 | 62 |
| | 56 | 0.21 | 66 | 36 | 81 | 81 | 38 | 39 | 50 | 50 |
| | 64 | 0.19 | 58 | 39 | 83 | 67 | 26 | 30 | 52 | 44 |
| | 56 | 0.16 | 50 | 32 | 68 | 68 | 23 | 31 | 25 | 32 |
| S.M. ... | 88 | 0.27 | 80 | 85 | 82 | 79 | 72 | 65 | 74 | 74 |
| | 88 | 0.24 | 83 | 90 | 84 | 79 | 69 | 70 | 60 | 63 |
| | 88 | 0.21 | 78 | 75 | 70 | 70 | 69 | 69 | 60 | 53 |
| | 88 | 0.19 | 73 | 81 | 68 | 74 | 66 | 59 | 49 | 40 |
| | 88 | 0.16 | 64 | 68 | 62 | 69 | 81 | 77 | 41 | 52 |

did not show such a marked falling off of performance when the exposure was shortened and in the experiments a greater range of exposures was given to them. This lack of sensitivity of some subjects to change of conditions is well known in this type of experiment.

2. The relative ease with which eye movements in different directions can be made is interesting. For an equal number of correct answers the exposure must be made longest in the top window and shortest in the right and left windows, the bottom window occupying an intermediate position. The effect is not so well marked for the subjects P.H. and S.M. The result can be expressed in another way by saying that the eye can look towards and recognise objects to the right and left more easily than objects below, and those below more easily than those above.

Several elements go to make up the time taken to recognise the test-object in our experiments. These, in order, are, (1) the latent period of vision, (2) the latent period of movement, (3) the time occupied in moving the eyes, and (4) the time taken to read the test-object. When using the shortest exposure of which our apparatus was capable it was possible both to name the window in which the letter was exhibited and also when looking straight at a window to recognise the direction in which the " C " pointed. The time taken in the experiments must have been almost entirely occupied by the time taken for the impulse originated by the flash to reach consciousness, and by the time taken to move the eyes. It does not seem likely that the latent period of vision should vary with the direction from which the flash came. We conclude, therefore, that the eye can be moved horizontally more easily than vertically, the difference being due in all probability to the more complicated muscular activity necessary for vertical movements.*

3. The investigation of the effects of glaring sources of light was the main object of the experiments. The results quoted in Table I A are of the preliminary investigation (Series A). The positions and intensities of the glaring sources used have been described already. With the exception of the greater number of mistakes made at the left window with glare inside left, the results must be considered negative. There is perhaps a slight tendency for the performance at all the windows to be worse, but not enough to warrant any definite statement. Glare outside left, which on account of its size and intensity might have been expected to influence the readings, is without any significant effect.

* In reading European languages the eyes move from left to right and this might account for the greater difficulty in moving the eyes vertically. A Chinese subject, however, accustomed to reading Chinese script, showed no greater facility in the vertical movements in the few readings which he had time to give us.

## TABLE IB

Showing the effect of (1) Time of exposure ; (2) Position of "glare" source on the percentage number of correct answers in reading the test-object in each window. (Series B.)

The number of readings from which the percentage is calculated is given at the beginning of each line (No. of exposures.)

| Subject | No. of Exposures | Duration of Exposure in Seconds. | WINDOW | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RIGHT | | | | LEFT | | | | TOP | | | | BOTTOM | | | |
| | | | No glare | Glare inside right | Glare right down | Glare outside right | No glare | Glare inside right | Glare right down | Glare outside right | No glare | Glare inside right | Glare right down | Glare outside right | No glare | Glare inside right | Glare right down | Glare outside right |
| D.C. | 60 | 0.30 | 96.5 | 36.5 | 90 | 88 | 96.5 | 91.5 | 91.5 | 93 | 71.5 | 66.5 | 70 | 80 | 91.5 | 83 | 85 | 93 |
| | 60 | 0.24 | 80 | 16.5 | 58 | 55.5 | 75 | 68 | 73 | 71.5 | 15 | 18 | 13 | 13 | 40 | 38 | 40 | 35 |
| | 60 | 0.21 | 43 | 21.5 | 45 | 30 | 48 | 55.5 | 35 | 41.5 | 15 | 10 | 20 | 11 5 | 33 | 18 | 23 | 28 |
| P.H. | 60 | 0.32 | 95 | 93 | 93 | 93 | 95 | 93 | 98 | 95 | 88 | 90 | 83 | 95 | 95 | 91.5 | 91.5 | 98 |
| | 60 | 0.27 | 90 | 80 | 73 | 85 | 75 | 80 | 70 | 68.5 | 71.5 | 78 | 81.5 | 80 | 90 | 76.5 | 81.5 | 78 |
| | 60 | 0.21 | 61 | 61.5 | 65 | 68.5 | 40 | 40 | 51.5 | 50 | 45 | 51.5 | 50 | 60 | 45 | 60 | 43 | 53 |
| M.K. | 52 | 0.30 | 96 | 86.5 | 98 | 100 | 96 | 94 | 100 | 96 | 96 | 88 | 77 | 92 | 90.5 | 82.5 | 90.5 | 84.5 |
| | 56 | 0.24 | 85.5 | 66 | 80 | 78.5 | 91 | 92.5 | 82 | 94.5 | 46.5 | 39 | 48 | 42.5 | 75 | 55 | 69.5 | 62.5 |
| | 48 | 0.19 | 70.5 | 43.5 | 75 | 70.5 | 70.5 | 70.5 | 64.5 | 68.5 | 29.5 | 14 | 18.5 | 20.5 | 39.5 | 37.5 | 29.5 | 33 |
| R.L. | 60 | 0.30 | 91.5 | 30 | 95 | 93 | 93 | 98 | 93 | 96.5 | 36.5 | 33 | 43 | 36.5 | 86.5 | 90 | 91.5 | 93 |
| | 60 | 0.27 | 81.5 | 25 | 78 | 80 | 88 | 90 | 91.5 | 83 | 33 | 23 | 20 | 23 | 73 | 63 | 73 | 68 |
| | 60 | 0.24 | 40 | 30 | 35 | 40 | 55.5 | 55.5 | 53 | 40 | 31.5 | 20 | 25 | 15 | 30 | 41.5 | 40 | 35 |
| S.M. | 100 | 0.32 | 93 | 92 | 88 | 88 | 95 | 88 | 91 | 95 | 85 | 85 | 85 | 85 | 91 | 92 | 86 | 84 |
| | 100 | 0.27 | 82 | 88 | 86 | 83 | 84 | 78 | 83 | 83 | 64 | 65 | 72 | 67 | 65 | 72 | 68 | 70 |
| | 100 | 0.21 | 77 | 71 | 72 | 85 | 63 | 65 | 70 | 58 | 63 | 73 | 68 | 62 | 48 | 42 | 47 | 38 |
| Mean of all subjects | | Long | 94 | 67.5 | 92.5 | 92 | 95 | 93 | 94.5 | 95 | 76 | 72 | 76 | 77.5 | 91 | 88 | 89 | 90 |
| | | Middle | 84 | 55 | 75 | 80 | 82.5 | 81 | 78 | 80 | 46 | 44.5 | 47 | 45 | 68.5 | 61 | 66 | 62.5 |
| | | Short | 58 | 45 | 58 | 58.5 | 55 | 57 | 55 | 51 | 37 | 37.5 | 36 | 34 | 39 | 44 | 36 | 37 |

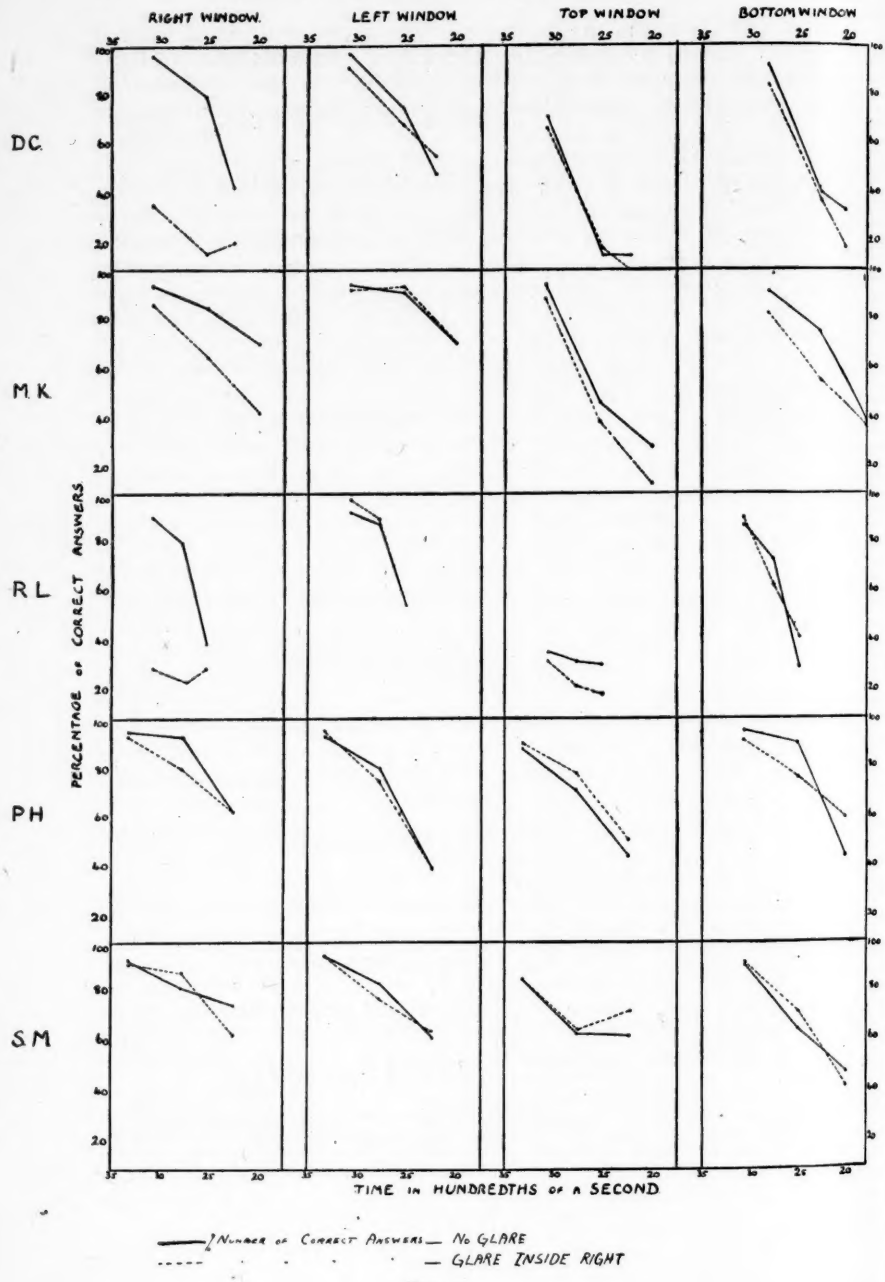

RIGHT WINDOW.
LEFT WINDOW
TOP WINDOW
BOTTOM WINDOW
DC.
M.K.
R.L.
P.H.
S.M.
PERCENTAGE OF CORRECT ANSWERS
TIME IN HUNDREDTHS OF A SECOND
% NUMBER OF CORRECT ANSWERS — NO GLARE
— GLARE INSIDE RIGHT

FIG. 2.

In the second series of experiments (Table I B and Fig. 2) the glare sources grouped round the right window were used. The grouping was chosen in this way so as to give some indication of the nature of disability produced. First, the visual acuity for the test-object in the right window, and therefore the speed with which it could be recognised, might have been less when glaring sources were near it. If this were the case, then all positions of the glare source should have been equally effective since they were at equal distances from the test-object. Secondly, the retina (macula) might have been " fatigued " when the image of the glare source fell on it. This would occur when the eyes were being moved towards the right window with " glare inside right " in operation. Thirdly, the glaring sources might be " distracting " stimuli during the movements of the eye, in which case both " glare inside right " and its near neighbour " glare down right " might be expected to participate equally whilst " glare outside right," lying as it did, outside the field of operations would have been less effective. The readings were taken in a sequence (explained earlier) which should have demonstrated any differential effect of the glare sources.

## TABLE II.

The readings taken immediately after an exposure made in the right window with a " glaring " source of light, are compared with those not so preceded.

The number of correct readings is shown as a percentage.

| | Glare source. | WINDOW. | | | | | |
|---|---|---|---|---|---|---|---|
| | | Left. | | Top. | | Bottom. | |
| | | Normal. | After reading at right window. | Normal. | After reading at right window. | Normal. | After reading at right window. |
| P.H. ... ... | Outside right. | 71 | 91 | 73 | 95 | 70 | 84 |
| M.K. ... ... | | 89 | 90 | 51 | 55 | 51 | 44 |
| R.L. ... ... | | 78 | 76 | 24 | 23 | 69 | 60 |
| S.M. ... ... | | 79 | 74 | 79 | 81 | 60 | 51 |
| P.H. ... ... | Down right. | 71 | 72 | 73 | 84 | 66 | 88 |
| M.K ... ... | | 83 | 100 | 52 | 60 | 61 | 81 |
| R.L ... ... | | 77 | 85 | 33 | 37 | 66 | 74 |
| S.M. ... ... | | 83 | 88 | 70 | 86 | 65 | 61 |
| P.H. ... ... | Right. | 79 | 81 | 75 | 81 | 72 | 81 |
| M.K.... ... | | 79 | 95 | 45 | 59 | 60 | 50 |
| R.L. ... ... | | 85 | 75 | 30 | 32 | 68 | 63 |
| S.M. ... ... | | 76 | 86 | 81 | 85 | 68 | 53 |

It will be seen from the results in Table I B that none of the readings with glare are significantly different from those without, except the readings for the right window with " glare inside right." As has been pointed out, the line of sight passes across this glare source in moving from the fixation point to the right window and we conclude that an after-image is formed on the retina or the latter becomes " fatigued " so preventing recognition of the test-object. Subjectively this phenomenon is well marked, a black splodge being seen in the place where the test-object should have been seen. The deleterious effect of a glare source situated on a line between the fixation point and the window is well marked for the subjects D.C., M.K., R.L., and F.W. : for the subjects P.H. and S.M. it is doubtful if it is present. These two subjects appear to be peculiarly insensitive to any of the changes of conditions investigated by us, whether by varying the length of exposure, using the top window, or by the introduction of a glaring source of light.

When readings were taken, the experimenter made a note of those exposures which followed immediately on the right window with " glare " readings. It was thought that the macula might take a few seconds to recover from the after-image in the case of " glare inside right " but no such effect was noticed, the readings being, if anything, slightly better. (Table II.) Apparently the eye recovers in less than 3 seconds, the average time between readings.

## Summary

1. We have measured the time taken for a subject to move his eyes away from a fixation point and recognise a test-object momentarily exhibited at an angle of 20° with the fixation point.

2. Six subjects did the experiments, two of whom were rather insensitive to changed conditions, whilst the other four reacted as follows :

3. Small variations in the length of exposure of the test-object have a marked effect on the number of mistakes made.

4. The ease with which eye movements in different directions can be made is in this order : right and left : down : up.

5. A glaring source of light in the field of vision has no appreciable effect on the number of mistakes except when it lies on a straight line between the fixation point and the test-object. This effect is attributed to after-images.

We wish to express our gratitude to the Medical Research Council (Physiology of Vision Committee), whose help has made this investigation possible.

# REPORT ON A CASE OF SO-CALLED COLOBOMA OF THE MACULA

BY

Lt.-Col. A. M. DICK, I.M.S. AND M. R. SAWHNEY, M.B.(Cantab.)

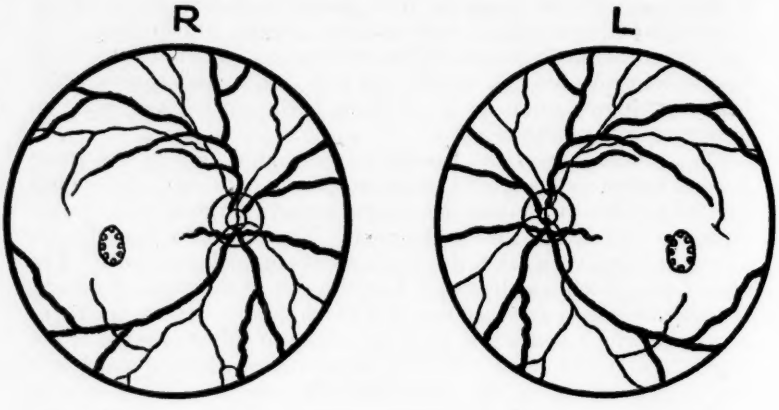
LAHORE

C. B., aged 43, a Hindu, attended the out-patient department of the Mayo Hospital, Lahore, on May 15, 1928, for defective vision. His distant vision was 2/60 in each eye. Near vision for each eye was Jaeger 1, at 4 inches. Contrary to what would ordinarily be expected in a person with the above vision there was no improvement with concave glasses, in fact they made the vision distinctly worse. After retinoscopy under homatropine his vision with plus 6D. sphere and plus 2D. cylinder, axis 180°, before each eye came up to 6/60 in each eye. There was no improvement in near vision.

On examination of the fundus it was found that it was quite normal except in the region of the macula in each eye. In the left eye the fundus in the macular region showed an oval white patch with the long axis of the oval vertical. The difference between the two axes being very little, the patch approximated to a circle. The size of this patch was less than half the size of the disc. On careful examination it was seen that this patch did not include the fovea centralis, which could just be seen a little to the nasal side of the upper limit of the patch. Retinal blood vessels stopped short near the margin of the patch, none coursing over it. There was no measurable ectasia of the patch. At the periphery of the patch and forming part of it were seen a number of small, round, white bodies which reflected light rather strongly and hence shone brightly under ophthalmoscopic examination. They had the appearance of crystals of cholesterine. Four of these bright white bodies on the nasal side and one in the upper part of the patch were the brightest. Occasionally during the examination, the whole of the patch seemed to shine like a phosphorescent body. Probably this was due to its reflecting light strongly at a certain angle. The rest of the patch looked white, stippled in places with very fine light grey points. On examination with a stronger light, such as that given by a Morton pattern Hamblin ophthalmoscope when light is reduced to a slit, there could be seen in the patch faintly but distinctly portions of two blood vessels, running horizontally from the periphery of the patch towards its centre for about one third of the width of the patch. One of these vessels came from the temporal and the other from the nasal side of the patch, neither of them quite reaching the periphery. These bits of vessels were probably the remains of the larger blood vessels of the choroid.

There was no pigmentation either in the patch itself or surrounding it. Its margins were very sharply defined and surrounded by a normal fundus.

The appearances in the right fundus were almost identical with those in the left. The size of the patch was practically the same as in the left, only it was inclined to be more circular. Similar shining bodies were found at the periphery of the patch as on the left side. The fovea could not be seen on the right side, but from the position of the patch and the appearances of its surroundings it could be seen distinctly that the patch involved part of the macula




in the upper part. No blood vessels could be seen on this side. Beyond this there was no difference on the two sides and on a cursory examination the two fundi looked almost identical.

There was no contraction of the field of vision. Although the central vision was deficient, a scotoma could not be marked out on the perimeter, chiefly on account of lack of intelligence on the part of the patient, as he did not fix properly. When, however, a finger was held in front of his eye he said that he could see distinctly the two proximal phalanges of the finger but could not see the terminal phalanx distinctly, thus showing that he had a relative scotoma.

He had no other congenital defect in the eye.

He gave the history of having always been short sighted, that is ever since he could remember. He had never worn glasses nor worried about his sight as, although he was literate, he hardly ever did any reading as he was a farmer and tilled his own lands. He only came to the hospital as he had come to Lahore to see his sons.

Two of his sons were examined. They had no defect beyond having a certain degree of refractive error. There was no history of syphilis either acquired or hereditary. It is of course impossible in these cases to be certain of the condition being congenital. But from the history and the appearances of the defect one could say that the condition was congenital or at least appeared soon after birth. There is little doubt that the case comes under the heading of so-called coloboma of the macula.

The chief points of interest in the case seem to be :

1. The size of the coloboma, it being less than half the size of the disc.
2. It was vertically oval and not horizontally oval as usual.
3. Its sharp definition.
4. The presence of round shining bodies which looked like cholesterine crystals, a degenerative product the result of an old haemorrhage or inflammation. This certainly goes in favour of the colobomata being pathological in origin.

According to Miss Ida Mann's classification this case comes under the heading of a non-pigmented coloboma.

## RETINAL DETACHMENT

BY

RICHARD KERRY

MONTREAL

A REPORT of three cases of retinal detachment treated by the writer with iodized oil and resulting in restoration of vision was published in this journal some time ago, Vol. XII (May, 1928). Two cases treated recently by this method have not given the same happy result but as neither case was seen until the condition had been established for some months this is perhaps not surprising. There are, however, some points of interest connected with these cases which seem to be worth recording.

Of the first case, one of general detachment in the left eye of a young girl, for which no cause was established, there is little to be said, as treatment was discontinued after a few weeks. The superior temporal vein, however, which had been very dark and shrunken in appearance and with the blood column broken in many places, seemed when last seen, to be functioning well and was normal in appearance except for some displacement due to slight retinal oedema.

The second case, an over-stout, rheumatic woman of sixty odd, wearing $-8$ D.sph. for the right eye and with the sight of the left

eye less than 6/60 from injury in childhood, presented an unusual condition. She complained of complete loss of sight in the right eye, coming on suddenly two days previously. Enquiry, however, as well as examination of the eye, showed that detachment must have been present for some months and that the sudden loss of sight must have been due to acute exacerbation.

On examining the fundus, one seemed to be looking into a truncated cone with the apex at the posterior pole of the eye, rather than into a globe. The retina was completely detached and of a translucent grey colour very slightly tinged with pink. There were no details of any sort visible, except that to the temporal side there was a strip of retina, running from the posterior pole to near the ora serrata, just below the horizontal meridian and about as wide as the disc, which was opaque and not oedematous. On this strip was a leash of dark shrunken vessels which seemed to spring from the posterior pole of the eye directly at the observer, although somewhat to the temporal side. Vision, practically *nil*.

Ten days later the fundus reflex was a much deeper red, the retina in more normal position, except below, although still oedematous. Neither disc nor vessels were visible, except the leash of vessels above referred to, which were now more to the temporal side, curved outwards and apparently carrying blood. Vision, fingers in the upper temporal field.

Two weeks later the position of the disc was indicated by the larger vessels which had become in part visible. The retina along the course of the vessels was in many places greyish-yellow with normal reflex in between. The opaque detachment had cleared in part and was broken by transparent sections. Vision, sees most of a white object in the central field, fingers in the temporal field and in the lower part of the nasal field.

Two months later the retina was apparently in normal position above and to well below the horizontal meridian on the nasal side, but on the temporal side the opaque strip and the retina below it was still detached. Below there was extensive detachment, billowed here and there by contracted exudate running along the course of the vessels. The patient has at times been able to make out half inch letters at ten inches, but central vision varies greatly, and, as the old detachment almost involves the macula, the outlook for permanent restoration of central vision is not hopeful.

When last seen, eight months after her first visit, there was no material change. On one occasion the disc was seen by the indirect method but the condition varies from day to day as does the patient's central vision which at times shows great improvement, but lasting for a few hours only.

The question of origin of the relatively massive exudate in this case raises an interesting problem. As there was no hypertension,

evident at any time and as the capacity of the suspensory ligament to transmit excess fluid is very limited, I incline to the view that the sub-retinal fluid was, in part at least, derived from the vitreous humour. The vitreous colloids being saturated with water are iso-electric with their surroundings and exert no colloid or onkotic pull, but an active inflammatory exudate, derived from the uveal vessels and situated between the cerebral and epithelial layers of the retina, would exert a decided pull upon the vitreous fluid, especially if the inner layer of the retina were damaged by inflammatory or traumatic insult. As the conditions present are compatible with displacement of fluid from the vitreous chamber either through the suspensory ligament or through the inner layer of the retina, further study will be necessary to enable an intelligent estimate of the degree in which each of these factors is active, to be formed.

## NOTE ON CONCRETIONS IN THE LACRYMAL CANALICULI

BY

R. R. JAMES

LONDON

THOUGH concretions in the canaliculi are not very frequently seen, they are perfectly well known to all ophthalmic surgeons as a cause of intractable conjunctivitis. I recently had such a case in a young man where the concretion was lodged in the upper canaliculus. The lower canaliculus was quite free and there was no interference with the passage of fluid on syringing the tear sac. It was not until a purulent secretion was observed flowing from the upper punctum on pressure over the inner canthus that the correct diagnosis was made. On slitting up the upper canaliculus the fragments of the concretion were easily expressed. The improvement was immediate, the patient announcing, when I saw him a fortnight later, that for the first time for 18 months the eye had been free from discharge and stickiness. The débris examined by the pathologist showed a profuse streptothrix growth.

It is easy to understand how, in the pressure of out-patient ophthalmic work, such a case can be overlooked. The conjunctival condition improves up to a point with the usual local treatment, but never gets quite well, and it is easy to see why. I would plead that in such cases the surgeon should not be content with investigating the state of the lower canaliculus only: he must remember that the upper canaliculus may be, after all, the site of the trouble.

## XIII INTERNATIONAL OPHTHALMOLOGICAL CONGRESS, AMSTERDAM, September 5-13, 1929.

---

The following is the programme of the chief proceedings:

*September* 5.

Opening of the Bureau.

Meeting of the International Council.

Opening of the Exhibition.

Opening of the Congress by Her Majesty the Queen-Mother.

Discussion of the Reports on methods of examination, standardisation and others.

---

*September* 6.

Demonstration Meeting.

Symposium on Glaucoma.

---

*September* 7.

Papers.

---

*September* 9.

Symposium on Trachoma.

Papers.

---

*September* 10.

Papers.

---

*September* 11.

Transference of Congress to Scheveningen.

*September* 12.

Papers.

Symposium on supra-sellar tumours.

Banquet.

---

*September* 13.

Papers.

General Meeting.

Closing Session.

Reception by the Municipality of the Hague.

---

## OXFORD OPHTHALMOLOGICAL CONGRESS XIXTH ANNUAL MEETING

THE XIXth Annual Meeting of the Oxford Ophthalmological Congress was held at Oxford on July 4, 5 and 6 last.

Members met informally at dinner on the 3rd in the Hall of Keble College, which had again offered its hospitality as in former years. The advantages which are gained by the all too short stay in the College, where each member is assigned rooms and becomes for the time being a student again, are quite one of the features of this successful annual gathering of ophthalmic surgeons, which was founded by the late Robert Doyne nearly twenty years ago. The proceedings of the Congress were held in the Department of Human Anatomy of the University, kindly lent for the purpose by Professor Arthur Thomson, to whom the Congress is under a deep debt of gratitude. In addition to the Scientific Museums, a Commercial Museum was on view in which fourteen well known firms of ophthalmic instrument makers exhibited the latest forms of apparatus and instruments.

The Master this year is Mr. BERNARD CRIDLAND, who has been Secretary for the past sixteen years. This appointment has been received with high approval by the members as it is common knowledge amongst them that one of the great factors in the continuous success of the Congress has been the work put into the organisation and arrangements of the meetings by Mr. BERNARD CRIDLAND.

An unusually large number of Foreign Members, and others resident abroad, attended the Congress this year, amongst whom were Prof. Josef Meller, of Vienna, Prof. Lundsgaard and Dr. Holgar Ehlers, of Copenhagen, Dr. Holland, C.I.E., of Quetta, Dr. Bernard Samuels, of New York, Dr. Thomas Poole, of Washington, Dr. Swan, of Evanston, Dr. Lichtenberg, of Kansas City, and Dr. J. A. van Heuven, of Utrecht.

The proceedings commenced on the morning of Thursday, July 4, with a short address of welcome by the Master.

Immediately following this Prof. MELLER opened his address with a short historical resumé of the treatment of diseases of the lacrymal sac, pointing out that the idea of making an opening into the nose could be traced back to Celsus. In the eighteenth century, Woolhouse suggested the purely surgical operation of extirpation of the sac, and finally Prof. Meller brought the historical review up to the methods of Toti and West in the present century. Contemporary methods of treatment were then discussed for pure epiphora without ascertainable involvement of the lacrymal passage. From this Prof. Meller passed on to the treatment of pure stenosis and considered those cases which would be benefited by probing. The great value of X-rays being used before treatment was insisted upon, and he deprecated the use of thick probes. Stricturotomy of the duct was then described. The medicamental treatment of chronic dacryocystitis was then fully explained. Following this, the treatment of acute purulent dacryocystitis was illustrated and the operative treatment of chronic dacryocystitis was delineated. The technique of the operation of extirpation of the sac was minutely described and the difficulties emphasised. The various intra-nasal operations were then related and commented upon.

Dr. J. S. FRASER followed, discussing the lacrymal question from the rhinological aspect. He confined his attention to the results of 108 dacryocystotomy operations, describing the technique minutely, its difficulties, complications, and results. The papers were discussed by Mr. HARRISON BUTLER and Mr. EDWARD D. D. DAVIS, who mentioned the nasal causes of dacryocystitis, of which in a series of ten cases, lupus caused 5, atrophic rhinitis 1, enlarged cystic middle turbinate 3, and carcinoma of the ethmoid 1, and further stated that his experience of West's operation had not been satisfactory. He emphasised the value of lipiodol in X-ray photographs as a means of diagnosis. Mr. Browning, Mr. Jameson Evans and Prof. Lundsgaard also joined in the discussion, the latter raising the question of tuberculous lacrymal disease, pointing out that it was generally secondary to a nasal infection. He drew attention to the Finsen light, mentioning that it had no perceptible effect on the closed sac but was decidedly favourable when the cavity was open. Prof. Meller replied to the discussion.

In the afternoon there were demonstrations in the Scientific Museum. Mr. MADDOX showed his cheiroscope and frame-fitting method. Miss MADDOX demonstrated a few simple expedients in squint training. Mr. BURDON COOPER showed spectrograms, showing the composition of the ash in the senile cataractous lens. Mr. THOMSON HENDERSON showed a specimen of an intradural tumour of the optic nerve; Mr. RAYNER BATTEN, a collection of drawings showing disease of the macular region. Mr. ARMSTRONG showed a recording scotometer, and Mr. GEORGE YOUNG a case of transplantation of the whole cornea and conjunctiva.

At the conclusion of the afternoon's proceedings, members and their friends repaired to the gardens of Exeter College for tea, where they were welcomed by the Vice-Principal of Ripon Hall, the Rev. J. S. Bezzant, Fellow of Exeter College, and Mrs. Bezzant, and Mr. Philip Adams, Fellow of Exeter College and Deputy Master of the Congress, and Mrs. Adams, who kindly acted as hosts and hostesses. The Annual Dinner of the Congress was held in the evening in the Hall of Keble College, at which the largest number in the history of the Congress attended. Among the guests were the Dean of the Oxford School of Medicine, Dr. Ainley Walker, the Rev. J. S. and Mrs. Bezzant, Dr. J. S. Fraser and Prof. Meller. In speaking on behalf of the Congress, the Master, Mr. BERNARD CRIDLAND, mentioned that 23 new members had been elected during the year and the total membership was now 411. He regretted to have to record the loss, through death, of Dr. Andrews, of California, and Dr. Beauman, of South Africa. The Master then gave a detailed account of the history of the Congress from the time of its inception, nineteen years ago, pointing out its remarkable and steady progress until it had assumed its present position of importance in the ophthalmological world. After referring to the numerous foreign and over-seas members present, he drew attention to the presence of Mr. Richardson Cross, of Bristol, a member of the original Council of the Congress, and added further that three quarters of the members of the executive of the Congress at the present time were former pupils of Mr. Richardson Cross. The Toast of the Visitors was proposed by the Deputy Master, Mr. Philip Adams, and replied to by Dr. Ainley Walker.

The proceedings on the morning of Friday were opened by Dr. THOMAS POOLE, of Washington, whose paper on " The effects of disease of the paranasal sinuses upon the fixation point," should be read in the original.

Mr. RIDLEY then read a paper on " An unusual complication of Hodgkin's Disease " in which the lacrymal glands were seriously infected.

Then followed the Doyne Memorial Lecture, the most important contribution to the proceedings of the Congress.

Instituted in 1916, in memory of the Founder, these lectures have proved the occasion for the appearance of much valuable and original work. This year the lecture was given by Miss IDA MANN, D.Sc., F.R.C.S., the subject being " Some observations on the vascularisation of the vertebrate eye." Prefacing her remarks with a fitting tribute to the founder, the lecturer for the purpose of this study divided the intraocular vessels into three groups, those of the retina, iris, and choroid.

The choroid was only briefly described, emphasis being laid on the vessels of the retina and iris. Reference was made to the stability of the structure of the choroid throughout the phylum, and to certain modifications which appear in some fish, producing the structure known as the choroidal gland. Reference was also made to the reflecting membranes, the argentea in fish, and the tapetum of the carnivora. It was pointed out that the variations of the retinal and iris vessels are of great interest as would be expected because both sets appear relatively late in ontogeny in all species. The development of the hyaloid vessel was minutely described and the varying forms were noted, and it was only in the higher mammals that a single vessel was found.

The main varieties of the adult retinal blood supply which are found among vertebrates are: (1) a completely avascular retina, the blood supply being entirely from the choroid, (2) an avascular retina associated with a pecten, (3) a vascular retina, supplied by vessels lying on its inner surface and (4) a vascular retina supplied by vessels ramifying in its substance.

The modifications of the anterior end of the hyaloid were divided into two groups, those with and without a pupillary membrane during development. The former being confined to the mammals, while the latter embraces the rest of the vertebrates.

The lecture was illustrated by over 60 lantern slides which were of extraordinary interest. These were chiefly drawn under slit-lamp illumination at the Zoological Gardens, and comprised among them anterior ocular drawings of a salamander, a python and numerous fish.

It is impossible in a short description to convey the extraordinary interest of this lecture, which was delivered in a very clear and lucid manner and commanded the greatest attention. At its conclusion Miss MANN was presented with the Doyne Memorial Medal for the year.

Mr. NICHOLAS HUGHES then read an original and interesting paper on the structure of the vitreous. This research had been carried out on sheep's eyes in which the vitreous was suspended in a vessel containing a solution of chloride of sodium of a specific

gravity adjusted to that of the vitreous. Observations were then made with the arc slit-lamp. The investigation showed that the vitreous has a slender attachment to the optic disc and a much firmer union to the ciliary processes. The interior of the vitreous is occupied by membranes which have a remarkable disposition, and their structure was fully described in the paper.

In the afternoon Lt.-Col. H. HERBERT read a paper, on " The cement substance of the intraocular muscles and chronic glaucoma," which is impossible to abstract and should be read in the original.

Mr. HUGH CAIRNS then opened a discussion on " The ocular manifestations found in head injuries." He stated that undue attention had been paid to the actual fracture of the skull and too little to the underlying brain. Emphasis was laid on the increase of intracranial pressure caused by haemorrhage or oedema of the brain substance.

It was difficult to decide which cases would benefit by operation and which would not. Blurring of the optic discs is seen in many cases where there is a large blood clot in the brain; in 80 patients, only 7 showed definite papilloedema; this latter sign was an indication for operative measures which would give the patient a better chance and avoid the chronic ill health which so frequently follows head injuries. Dilatation and fixation of the pupil indicated the side of the more serious lesion. Homonymous visual field defects were rarely seen in civil practice, and injury to the fibre tracts and nuclei were also rare. Persistent headache and photopsia following a head injury was not functional but was probably due to an unresolved cerebral contusion.

Mr. CHARLES GOULDEN then discussed the subject from the point of view of the ophthalmic surgeon. He described very fully the direction which fractures take when blows are applied to certain parts of the skull, and showed that a fracture involving the optic canal can occur in any fracture of the skull but is most common when the blow is in the neighbourhood of the external angular process. The various ocular symptoms due to haemorrhage into the sheath of the optic nerve were described and the important pupillary reactions well portrayed. The various ocular paralyses were minutely gone into and their localising value explained. Pulsating exophthalmos and its causation were also described, as were haemorrhages into the orbital region, dislocation of the eyeball and its mechanism.

On Saturday morning Mr. BERNARD SAMUELS, of New York, gave a paper entitled " Necrosis of the iris," the results of his research work in the Vienna Clinic under Prof. Fuchs. It was illustrated by a number of slides which demonstrated the condition very clearly. It was discussed by Prof. MELLER, who emphasised

the difference between primary and secondary necrosis of the iris.

Dr. GEORGE YOUNG, of Colchester, was to have given the next paper but was unfortunately taken ill. Mr. PHILIP ADAMS, the Deputy Master, kindly filled the hiatus by reading an interesting paper on three cases of toxic amblyopia, due respectively to iodoform, digitalin, and chlorodyne.

Dr. H. T. HOLLAND, C.I.E., of Quetta, then read a very instructive paper on " Iritis as a post-operative complication of cataract extraction," being a review of 2,627 consecutive extractions for cataract, of which the large majority had been intracapsular, and showed that a higher proportion of iritis took place in those operations which were performed with capsulotomy.

This concluded the proceedings; the attendance of 112 constituted a record in the history of the Congress.

C. RUSS WOOD.

## MEETING OF THE BRITISH MEDICAL ASSOCIATION, MANCHESTER, JULY 24 and 25, 1929

### Section of Ophthalmology

After a short introductory address by Mr. GRAY CLEGG, the President of the Section, Mr. MACCALLAN introduced a discussion on " Toxic absorption due to focal septic lesions and its effect on the production of eye diseases." He detailed the various sites of the septic foci, the more common being dental apical abscesses and septic infections of the tonsils, especially in children. Less commonly, intestinal sepsis, chronic appendicitis and sepsis of the pelvic organs in women. The various ocular diseases which were attributed to these causes were corneal ulcer, episcleritis, conjunctivitis, chalazion, iridocyclitis, phlyctenular conjunctivitis, dacryocystitis, retinal hyperaemia, vitreous opacities, primary glaucoma, cataract and progressive myopia.

Dr. ARTHUR HURST said that the mouth should be considered as a whole and in the examination of the teeth all those that were dead should be regarded as possible sources of infection and, even in edentulous patients, buried septic roots should be searched for and extracted if found. He agreed that the tonsils and paranasal sinuses were a frequent source of infection, but did not think that duodenal ulceration was to be regarded as a cause. In Dr. Hurst's experience achlorhydria was a common cause of septic infection due to the loss of bactericidal power of the gastric juice. Mr.

MUSGRAVE WOODMAN stated that in his opinion the upper nasal sinuses were a frequent source of infection, not only in ocular but also in cerebral conditions. The technique of washing out the upper ethmoidal sinuses together with that of the sphenoid was described, and the results obtained under this form of treatment; the difficulties which were encountered when these areas were irrigated was dwelt upon. Dr. ARNOLD RENSHAW considered remote, as opposed to direct infection, was very frequently a cause of inflammatory ocular conditions. These could be divided into four groups: (1) Infection during a septicaemia. (2) Embolism in chronic sepsis. (3) Reaction to toxin, elaborated in another region, and (4) degenerative changes due to abnormal enzyme action. Dr. ERNEST MADDOX confined his remarks to dental infection and pointed out the close relation between the teeth and the eyes; but warned his hearers that because dental sepsis was present it was not necessarily, though very frequently, the cause of the ocular condition. He quoted some cases of detached retina which had been relieved by dental extraction. It was pointed out that in children the upper and exposed parts of the teeth were generally infected, and in these patients the superficial parts of the eye, such as the cornea, etc., were attacked, whereas in adults the deeper parts of the teeth, such as the roots, were diseased and similarly the deeper parts of the eye were affected. Mr. INGLIS POLLOCK emphasized the danger of unirrupted infected teeth which were a cause of ocular disease. He did not think retrobulbar neuritis was frequently due to paranasal sinusitis and rarely found operation on the nose necessary in these cases. Dr. P. WATSON WILLIAMS drew attention to many cases of paranasal sinusitis which caused ocular disease, and differentiated between a bacterial and toxin infection. The attempts of tissue defence were described and the advantages of eliminating the primary focus dwelt upon. Dr. E. J. PRIMROSE described syphilitic ocular infections which were combined with septic infection and other general conditions and said that treatment should be carried out for each condition. Mr. ORMOND discussed the septic causes of detached retina and suggested a chemical origin of the disease. He asked the opener if he had found septic foci in the teeth in the case of dendritic ulcers of the cornea. Mr. LEASK quoted fourteen cases of orbital cellulitis due to para-nasal sinusitis. Mr. T. AUBREY JONES thought that these ocular diseases were merely symptoms and had treated these cases on the lines advised by Mr. Macdonagh. Mr. GRAVES mentioned infections of the pituitary body due to sepsis and their treatment by non-specific protein therapy, such as T.A.B. vaccine, and pointed out that residual abscesses in the antrum were not infrequent causes of these conditions. Mr. BISHOP HARMAN discussed the question of septic ocular conditions due to a dental cause, in children, and

showed the position in the cornea in the lower and inner part where the condition begins when due to dental infection.

On Thursday, July 25, Mr. W. H. KIEP described a modification of Lagrange's operation which consisted of a thickened flap of conjunctiva dissected down to the corneo-scleral margin with a small furrow made near it, a keratome being used for the incision into the anterior chamber and a small portion of the lower lip of the wound being then excised. This is followed by a small peripheral iridectomy and finally the conjunctiva is sutured. The advantages claimed were simplicity and less liability to late infection. Mr. INGLIS POLLOCK supported the previous speaker as regards the advantages of the Lagrange operation, suggesting the chances of the conjunctival fistula closing in these cases were remote and the end-results better. He preferred the use of the Graefe knife rather than the keratome. Mr. BERNARD CRIDLAND thought the Lagrange operation was the best in chronic glaucoma and advised waiting to operate until the tension was reduced to about 40 mm. In his experience, late infection was extremely rare in these cases. Mr. MACCALLAN discussed the question of late infection and thought it was often due to focal sepsis. Mr. MCNABB quoted a case of late infection in Elliot's operation. Mr. ERNEST MADDOX asked if the opener of the discussion had experienced any difficulty in excising the scleral tissue. He described two modifications of Lagrange's operation. Mr. NELL also supported the view of the advantages of Lagrange's operation. Mr. GRAY CLEGG had seen very few infections after Elliot's operation and thought the chances of healing of the sclerotic fistula were greater in Lagrange's operation. Mr. KIEP in reply said he did not agree with the preliminary posterior sclerotomy but always advised injections of hypertonic saline as he had found them more efficacious.

Mr. BERNARD CRIDLAND read a paper on " Minor injuries to the eye in industry," and pointed out that there had been a steady increase of these cases during the last twenty years. The various occupations which caused these injuries and their varieties were described. He showed that protective measures were not used in 70 per cent. of the cases. The loss of time to the workmen was estimated, and shown to be on an average that for every three injuries one day's loss to the workman was incurred. He dwelt upon the economic importance of these factors. Protective measures were fully described and various forms of goggles were shown to the meeting. Mr. BISHOP HARMAN commented on the large number of these minor accidents and said the type of goggles used was not ideal in many respects. Mr. AUBREY JONES mentioned the number of accidents taking place in coal mines and pottery districts and considered that the employers were not very enthusiastic with regard to the use of protective measures for the

workers, and further mentioned the large amount of time lost with regard to these cases. Mr. TUDOR JONES discussed the question of wearing glasses in coal mines. Mr. BICKERTON stated he thought the Insurance Companies should be approached as regards the premiums paid in those cases where protectors were in use.

Mr. T. L. DE COURCY read a paper on " The significance of vitreous opacities." He described the development of the vitreous and demonstrated its structure in the adult. The formation of opacities was due to the condition of the blood vessels, the state of the blood, and vestigial remains. It was shown that, in a series of cases, 37 per cent. had vitreous opacities, and the method of examination was described. The causation of asteroid bodies was discussed, also their treatment.

Mr. JAMESON EVANS read a paper on " Blindness in old age." The provisions of the Blind Persons Act were criticized and it was shown that the number of these cases was rapidly increasing. The various causes of blindness in old persons were described and it was shown that the chief one was cataract. Mr. BISHOP HARMAN discussed the cause of blindness in old people and stated that his figures showed that the largest number was due to macular degeneration. He thought it would be unwise to have a hard and fast rule as regards the definition of blindness. Mr. CLEGG asked if it was obligatory for a blind patient with cataract to have it operated upon.

## ABSTRACTS

### I.—TUMOURS

(1) **Treacher Collins, E.—Diseases of the retina. Notes on the natural history of retinal neoplasms.** *Trans. Ophthal. Soc. U.K.*, Vol. XLVIII, p. 107, 1928.

(1) **Treacher Collins,** in a paper read to the Ophthalmological Society of the United Kingdom at the Annual Congress in 1928, discussed the natural history of retinal neoplasms under the following headings :—

(1) *Are cases of retinal glioma on the increase?*

An analysis of cases suffering from glioma at Moorfields Hospital between the years 1871—1924 shows that this disease is not increasing, for during the first 26 years of this period (between 1871 and 1897) 83 cases were examined, and during the remaining 27 years (1897—1924) 80 cases have been seen.

(2) *Why is glioma of the retina only met with in the early years of life?*

Retinal glioma is limited to the early years of life because it arises from cells which become highly specialised and soon lose all capacity for reproduction.

Berrisford investigated cases of glioma at Moorfields and found that sometimes the signs were present at birth, and frequently within the first two years of life; the oldest patient was 7 years. Of 135 cases examined at Moorfields 102 showed signs of this neoplasm during the first 3 years of life. Wintersteiner found that in 400 cases of glioma of the retina two-thirds occurred during the first 3 years of life, and that one third were present at birth or during the first year.

The author gave an account of 3 cases of bilateral excision for glioma. The first case was alive and well 5 years and 9 months after excision, the second 10 years and 2 months after excision, and the third 36 years after the removal of the second eye. The last case earned her living as a typist at St. Dunstan's, swims, and enjoys life.

(3) *Why do cells in metastatic growths of retinal glioma often differ from those of the primary growth?*

The cells in metastatic growths sometimes become increased in size and altered in shape, due to a change in their environment, the chief alteration consisting in an increased vascular supply, in the primary growth the blood vessels being only terminal vessels. Prof. Spemann in his Croonian Lecture at the Royal Society showed how transplanted pieces of foetal tissue are capable of metaplasia, and may assume the characters of the part into which they are transplanted. He says that there is some factor acting in the new place that dominates the definite fate of the transplanted pieces.

(4) *Why do eyes containing retinal glioma sometimes shrink?*

Treacher Collins suggests that the following factors play a part in the shrinkage of the globe. The invasion of glioma cells into the tissues of the globe, and particularly the uveal tract, gives rise to a specific tissue reaction; fibrous tissue is formed and this compresses the tumour cells, and by contraction causes the growth to shrink. Absorption of the growth is promoted by extension of blood vessels from the uveal tract, the degenerated parts being removed by phagocytosis.

Invasion and destruction of the ciliary body by the neoplasm diminishes the supply of intraocular fluid, the loss of which contributes to the shrinkage of the globe.

(5) *Why, in glioma, do metastases occur mostly in the vicinity of the affected eye, and in sarcoma of the choroid mostly in the viscera?*

Glioma of the retina arises from neural epiblast and conforms with carcinomata in other parts of the body in dissemination by centrifugal permeation of the lymphatics draining the affected area. Hence secondary growths are more frequent in the vicinity of the eye than in the internal organs. Of 22 cases of glioma examined post-mortem 17 had recurrences in the orbit, whereas out of 79 cases which died from secondary deposits following sarcoma of the choroid only 7 showed recurrences in the orbit.

(6) *Do primary new growths arise from the mesoblastic constituents of the retina?*

The author described cases of capillary angiomata of the retina, but said that more evidence is required about primary malignant growths of the retina before this can be regarded as proved.

H. B. STALLARD.

(2) **v. Hippel, E.—Spontaneous cure of a retinal glioma. (Selbstheilung eines Netzhautglioma.)** *Klin. Monatsbl. f. Augenheilk.*, Bd. LXXXI, S. 30, 1928.

(2) The following case history published by **v. Hippel** justifies its inclusion among the rare instances of spontaneous healing of a glioma of the retina.

The right eye of the patient was removed at age 5 in 1891, at Göttingen, by Schmidt-Rimpler, for glioma endophytum; and at that time the left eye was considered to be normal. He was examined in September, 1925 (aged 34 years), and the vision, although good, showed a large scotoma 20 degrees above the fixation point. The fundus showed a large vertically oval area of discolouration in the pigment epithelium, from the centre of which an uneven mass rose to a height of +6 D. with a white uneven surface. It gave the appearance of lobules and mounds arranged in several layers, and was interspersed with bright red vascularized areas. Hanging over it was a fine veil-like vitreous opacity.

From the nature of the case a dogmatic diagnosis is impossible; but v. Hippel considers that the resemblance which the history and the appearances bear to the few other published cases justifies its inclusion in this category: and he concludes that it represents a glioma which had degenerated, collapsed, and partially calcified.

Other references are: Siegrist, Heidelberg, Ber., 1912, and *Klin. Monatsbl. f. Augenheilk.*, 1920, S.120, 387; Deutschmann, *Zeitschr. f. Augenheilk.*, 1912, Bd. XVII, S. 225; Purtscher, *Hirschberg's Zentralbl.*, 1915, S. 193; Meller, *Hirschberg's Zentralbl.*, 1915, S. 101; *Zeitschr. f. Augenheilk.*, 1922, Bd. XLIV, S. 1: Stickerling, Dissert, Freiburg, 1927.

W. S. DUKE-ELDER.

(3) **Greenbaum, Sigmund S. (Philadelphia).—Syringocystoma of eyelids.** *Amer. Jl. of Ophthal.*, April, 1928.

(3) **Greenbaum** emphasises the importance of this condition by stating that at times some of the lesions undergo epitheliomatous changes. The disease is commoner in females and develops soon after the age of 20 and shows no tendency to spontaneous disappearance. The lesions consist of multiple yellowish-white spots, two or three millimetres in diameter, most commonly placed in the skin of the lower lid. Histologically they are found to consist of cylindrical tracts of epithelium with numerous tube-like canals through them. The points in differential diagnosis are as follows:—(1) Milia disappear on puncture and expression of their contents. (2) Xanthelasma has a different appearance, affecting a larger area, being near the inner canthus and more yellow in colour. (3) Molluscum contagiosum spots are more elevated and show a minute follicular orifice through which the cheesy contents can be expressed. (4) Fibromata are usually single, hard and elevated. (5) Multiple benign cystic epitheliomata (trichoepithelioma) consist of pearly-looking lesions, elevated to a variable degree above the surface. The treatment of syringocystoma consists in destroying each lesion with a fine cautery point.

F. A. WILLIAMSON-NOBLE.

(4) **Pack, George T. (Birmingham, Ala.).—Radiation therapy of cancers of the orbito-palpebral region at the Radium Institute of the University of Paris.** *Arch. of Ophthal.*, May, 1928.

(4) **Pack** emphasises that the Curie Foundation exists for the purpose of bettering present methods of cancer treatment and of establishing a rational basis for radium treatment. Cases which have already received radiation treatment elsewhere are therefore not accepted, and all cases which are accepted are first submitted to excision of a small part of the tumour with histological examination. Dosage is all important, since if this is incorrect, the tumour may develop a radio-resistance which is permanent, an improper first treatment may thus render a neoplasm incurable by radiation. If the eye has been enucleated, the ulcer usually involves most of the orbit and is adherent to the underlying bone. Such cases are best treated by X-rays because their use permits a very great focal distance and thereby eliminates the danger of unequal radiation. More or less radio-necrosis of the bone follows this procedure, and it is dangerous to attempt surgical ablation of these areas of osteonecrosis. It is worthy of note that when a patient presents himself with neoplasm involving the eyeball it is unwise to practise enu-

cleation prior to radiation since the eye protects the wall of the orbit from necrosis. The statistics from growths in the region of the eye are as follows: the total proportion of complete cures was 66.6 per cent., and the proportion of local cures by radiation was 74.5 per cent. Ocular complications were remarkably few, being confined to transient conjunctivitis and temporary loss of lashes and eyebrows. With regard to therapeutic indications excision is indicated when the growth is small and can be totally removed with a good margin of skin. Surgical removal is also recommended if primary treatment by radiation has failed, further treatment by radiation having been found useless. In all other cases, except those where large areas are involved in the orbit, radium therapy is the method of choice. If the tumour is intraocular and radio-sensitive radio-treatment is deemed better than enucleation.

The focal distance of the radium from the skin depends on the nature of the lesion. The distance is obtained by the intervention of a special wax which is transparent to gamma rays. The wax softens readily at 40°C. and can be moulded over the tumour, the thickness required varies from 5 to 15 mm. The time of application is extended over four to eight days to destroy the " mother cells " which divide at successive intervals and therefore at some time pass into the phase of maximum vulnerability. The length of each application varies from 8—12 hours a day.

F. A. WILLIAMSON-NOBLE.

(5) **Magnasco, M. (Rome).—On prelacrimal tumours. (Sui tumori prelacrimali.)** *Saggi di Oftal.*, Vol. IV, 1929.

(5) **Magnasco** relates the history and describes the histology of three cases of tumour in the neighbourhood of the lacrimal sac. The first was that of a serous cyst, the size of a large hazel nut which infiltrated the floor of the orbit. The second was a very small serous cyst, immediately under the skin in front of the lacrymal sac. The third was the most interesting, and presented a problem for diagnosis. It turned out to be a pseudo-tumour growing in the subcutaneous connective and muscular tissue in front of the lacrymal sac, due to chronic myositis of the orbicularis with degeneration, necrosis, and infiltration of varying degree in the tissues involved. The author considers that it probably arose from the bite or sting of some animal. The illustrations which accompany the article are excellently reproduced, as in all papers in this book, but the gloss on the paper makes the letterpress tiring to read.

E. E. H.

## II.—OPTICS AND REFRACTION

(1) **Edinger, Mary (Zürich).—The blind spot in axial myopia. (Der Mariottesche Fleck bei Achsenmyopie.)** *Arch. f. Ophthal.*, Vol. CXXI, p. 126, 1928.

(1) **Edinger** employed a Bjerrum's screen to determine the size and site of the blind spot in a series of myopic eyes (*a*) with no changes round the optic disc or only a scleral crescent, (*b*) with distinct juxta- or circum-papillary choroidal atrophy. The measurements she obtained from uncorrected and corrected eyes showed that the centre of the blind spot in the uncorrected myopic eye is slightly nearer the fixation point than in the emmetropic. In the corrected eye the blind spot is moved 1°—2° further to the temporal side: this is due to the prismatic action of the temporal half of the concave lens. In the corrected eye it is, in the majority of the cases, larger (vertical diameter 6°—7°: horizontal, 5°) than in the uncorrected (vertical 5°—6°: horizontal 4°—5°): this is mainly due to the fact that the dispersion-circles on the retina are abolished in the former class by the correcting lens.

In eyes with only a scleral crescent and no choroidal changes there is no, or scarcely any, increase in the size of the blind spot, compared with that in emmetropia. There is, however, always a certain increase in eyes showing juxta- or circum-papillary choroidal atrophy, but this depends not so much on the extent of the atrophic area as on the question whether the atrophy is only in an early stage or advanced.

THOS. SNOWBALL.

(2) **Harrison Butler, T.—Ophthalmic school clinics.** *Public Health*, May, 1929.

(2) **Harrison Butler's** association with school clinics extends over a period of 16 years, and this paper is based upon his experiences. He emphasises the importance of correcting high degrees of refractive error, not merely from the ophthalmological standpoint, but from the standpoint of the child's general psychical development. Defective vision may produce what the Americans call a "bad mixer," introspective and perhaps even more selfish than the majority of his friends. Quite a fair proportion of children are brought to the clinic complaining of headaches on reading but without any ocular cause for these, and there are others in whom the most painstaking correction of refractive and muscular errors fails to cure the headache. The author's explanation of these cases is that they do not come of a studious strain and are by heredity unfitted for the stress of brain work. He has seen native girls in

Palestine · doing hard physical work and never showing any neurotic failings, whereas the worst forms of hysteria may become manifest when the same girls are placed in a mission school. With regard to examination of visual acuity, it is pointed out that many children, especially at the first examination, will not make the necessary mental effort to read the smallest letters, although perfectly able to do so. In cases requiring a cycloplegic, it is found better to instil atropine at the clinic than to entrust this duty to the parents. The children receive three instillations of 1 per cent. watery atropine at quarter-hour intervals, the first being given two hours before examination. The author is not in favour of ordering glasses directly from the retinoscopy, but prefers a subjective examination in children who know their letters. He finds that many of them are better at choosing the axis of a cylinder than are some adults. " An intelligent nurse will often obtain better results than the surgeon; she has generally more patience and the children have more confidence in her than in an unknown man." If there is a material difference between the subjective and objective findings, the author performs both examinations again himself. In ordering glasses the author carries out the usual procedure of deducting one dioptre for the cycloplegic in cases of hypermetropia up to 7.5D.; for higher amounts he deducts 1.5 to 2D.; myopes are given their full correction, but if the myopia is less than 1.5D. a post mydriatic test is performed. In his private work he refracts many children, particularly myopes, without a cycloplegic. An interesting observation is made about the post-mydriatic testing of cases of compound myopic astigmatism. If the sphere is not high enough, the child will take his cylinder at right angles to its correct position, because he sees better with one meridian fully corrected even if the astigmatism is doubled, than he does with astigmatism corrected and the spherical factor under-corrected. In cases of convergent squint, the author never operates until glasses have been tried for a year or more and he prefers to wait until the child is eight. The operation is generally performed under cocaine and usually consists in advancement of the external and recession of the internal rectus. For amblyopia he states emphatically that the fixing eye must be bandaged up so that no light can enter, and that this occlusion must be continuous from dawn till eve. Under this treatment 70 per cent. of children gain full acuity and others are greatly improved, the usual rate of improvement being one line of test type per month. Relapses are common and it is advisable to leave off the occlusion gradually. Fusion may be obtained when the vision in the two eyes is equal and their axes have been set straight by operation, but the author is very doubtful of the utility of fusion training. His observations on myopia are that it is commonest in mining villages when there is a lot of inbreeding,

less common in agricultural districts and least common in the towns. He is against the theory that advance of myopia is caused by close use of the eyes and advances several arguments to support his contention. Debilitating disease and close confinement in stuffy schools will, on the other hand, bring about general laxness of the tissues of the body including the sclera. He therefore advocates a normal education for ordinary myopes, but forbids music and novel reading during term as all the patient's spare time must be spent out of doors playing games and getting fresh air. In the higher degrees of myopia, afternoon school is forbidden so that a still longer period of the day can be spent in manual exercises. The author concludes an interesting and well-written article with some general considerations, among which are the following:—The medical man in charge of a school clinic must be an expert retinoscopist, a faculty demanding some years of training and quite impossible of achievement by merely a few weeks' work as a clinical assistant. He should also, if possible, be on the staff of the local hospital so that he himself can carry out operative and any other forms of treatment that may be necessary. Finally, although the work of an ophthalmic school clinic has its dull side, " the child is the real refining influence in the world, and those whose privilege it is to attend a school clinic gain a reward which is not measured by material advantage."

F. A. WILLIAMSON-NOBLE.

(3) **Levy, A. H.** (London).—**Telescopic spectacles.** *Brit. Med. Jl.*, September, 1928.

(3) **Levy,** in a brief but comprehensive paper, gives an account of the history of telescopic spectacles and also of their more modern forms together with an account of the optical principles involved. The chief difficulties involved in designing telescopic spectacles are the deformation of obliquely incident light, and the amount of chromatic aberration. He points out that the first difficulty can be partly overcome by adopting a series of measures, the most important of which are (1) suitably bending the optical elements in the telescope, (2) by limiting the field of vision so that only tolerable distortions of the images are evident at the edges of the fields, and (3) by varying the separation of the two elements. The chromatic aberration was a great difficulty because it was impossible to make the object glass achromatic on account of the weight; this problem was only solved when Gullstrand showed that the chromatic correction would be sufficient if the chromatic difference of magnification of the principal rays entering the eye was removed—that is to say, the chromatism would be sufficiently corrected for practical purposes in such a low-power telescope by making the eye lens of a combination of a flint and crown glass.

Telescopic spectacles can be made to give a magnification of about two diameters and are chiefly of use in cases of high myopia. For details of the optical principles involved in prescribing such glasses the original paper should be consulted. The accompanying diagrams are of great assistance in following the text instructions. Levy concludes his paper by insisting on the great care necessary both in prescribing and in fitting such glasses, if they are not to be discarded as worse than useless.

E. E. H.

## III.—MISCELLANEOUS

(1) **Ramsay, A. Maitland (St. Andrews).—The importance of general methods in the treatment of diseases of the eye.** *Glasgow Med. Jl.*, November, 1928.

(1) It seems quite appropriate that **Ramsay**, the first recipient of the Mackenzie Memorial Medal recently instituted, should devote his address to general methods in ophthalmic treatment rather than to any special ophthalmic subject. For Mackenzie was physician first—a general practitioner—and oculist afterwards; and it is Ramsay's text that sound medical, especially sound physiological, knowledge should antecede specialism. He reminds us that Mackenzie, " one of the greatest clinicians who ever lived," possessed neither instruments of precision nor bacteriological nor biochemical equipment. (Mackenzie died in 1868 at the age of 77; the ophthalmoscope was described by Helmholtz in 1851, so that Mackenzie was already 60 years old when the instrument was first mentioned, to say nothing of being in general use.) Yet, at the age of 40 years he produced a treatise on eye diseases which remains to this day one of the foundation stones of our tabernacle of modern ophthalmology, or, as Ramsay put it, the work was " monumental."

" In clear and correct language Mackenzie described eye diseases as he saw them, and has given us word portraits which are faithful reproductions of Nature, and as true to-day as when they were written. In the great majority of instances the colours are as vivid as when the picture was painted." Nowadays general practice and specialism cannot be simultaneously engaged in, the field is too wide, " the day for admirable Crichtons is past." Nevertheless, says the author, " the whole is always greater than the part, and the functions of the eye in the animal economy cannot be fully grasped unless they are studied in their relation to the body as a whole." It is not feasible in an abstract to make reference to all

that Ramsay has to say in support of his argument for general methods. Two sentences only will be given. " ' The young man in a hurry ' who thinks he knows all about his special subject, runs a great risk of being a danger both to himself and to the community among whom he practises. His enthusiasm, so praiseworthy in itself, stands in need of direction, and can only lead to disaster if permitted to have full scope within the narrow and cramping boundaries of his speciality." And again : " When dealing with young patients suffering from squint, diplopia, or asthenopia and headache, tenotomy is sometimes performed, or a rectus muscle is advanced, whereas it would be better treatment to delay considering the question of operation until every opportunity had been given for the recovery of the balance of muscular power by promoting an improved condition of general health."

ERNEST THOMSON.

(2) **Traquair, H. M. (Edinburgh).—Tobacco amblyopia.** *Lancet*, December, 1928.

(2) Under the bald and—to the specialist—somewhat uninviting title " *Tobacco Amblyopia* " **Traquair** contributes to the *Lancet* an original and informative article which is perhaps of more value to the specialist than to the general practitioner. It is based on a statistical investigation of all the cases of tobacco amblyopia which occurred at the two eye clinics (designated by the author A and B) at the Edinburgh Royal Infirmary during the years 1913 to 1926. The rather curious fact emerges that there is a decided difference in the incidence at the two clinics; since the staff in one clinic was constant during the period while that in the other was not, it would seem easy to explain the difference as due to difference of observation, but the author appears not to think that such difference of observation is the cause of the variation in incidence. He gives us no clue as to which clinic is which, though it is not difficult to make a shrewd guess.

Taking both clinics together the percentage of tobacco amblyopia comes out at 1 per cent. of the total patients as against 0.2 to 1.4 per cent. recorded elsewhere. Nearly all the patients consumed from 2 to 4 ounces of tobacco per week. Four cases used only ½ ounce, 28 used 1 ounce, while 74 used 5 ounces or more. In Table 1 the highest consumption is given as 12 ounces, but in the text 9 ounces " in only one case." In four males and one female the tobacco was in the form of cigarettes, from 130 to 280 per week. Two males and two females took snuff from ½ to 1 ounce weekly. There were only six females in all. The details of the monthly incidence may here be omitted. The age incidence corresponds with that found by others, the peak being at age 50 to 54, 199

patients out of the total of 1,051. Occupations are classified in 21 groups. " A preponderance of about 14 per cent. in favour of indoor occupation was found, but as a large proportion of the industrial population is engaged in indoor work, this does not seem to be enough to indicate that indoor occupation *per se* especially favours the production of amblyopia. . . . On the whole the figures suggest that sedentary and confined occupations are apt to provide suitable conditions for the development of the disease." Light, in the author's opinion, has no influence (*vide infra*). Traquair enters fully into the much-disputed question of the influence of alcohol in the causation of the disease. This matter was discussed at the *Ophthalmological Society U.K.* in 1887 when very definite opinions were expressed against the importance of alcohol as a factor, yet much difference of opinion still prevails. In order to obtain light on this subject the author undertook an investigation of the police statistics of drunkenness for the period 1913 to 1926. Considerations of space prevent the reviewer from discussing these statistics in an abstract, especially in view of the author's very definite conclusion :—" A relationship was found between crime, drunkenness and poor relief, but none between tobacco and any of these factors. I am informed that *all* (no doubt an exaggeration) french polishers drink methylated spirits and, curiously enough, in the whole 1,088 patients there is not a single french polisher." The clinical picture of alcohol poisoning is different from that of tobacco. Three cases are mentioned. " It is evident that the rôle of alcohol varies according to locality and is dependent not so much on the amount of alcohol consumed as on its purity. . . . In Britain, and certainly in the Edinburgh area, the amount of wood spirit is minimal and the part played by alcohol may also be regarded as minimal—that is to say we have here to deal with a pure tobacco amblyopia." Under the heading " Clinical Features " the author gives a close description of various subjective symptoms and points out the circumstances which influence the onset, the diminution or the aggravation of these symptoms. His attitude towards the patient who will not obey the instruction to stop tobacco appears to the reader as somewhat sympathetic : " No case ever progresses to complete blindness." Previously in this abstract it was stated that according to Traquair light has no influence on the disease. As the macula is the part of the retina most exposed to light one might expect light to be a factor. But the author explains why it is not so in a paragraph which deserves full transcription, more particularly since the author is a well-known authority on perimetry. " The characters of the field defects have been frequently described, but appear still to be incompletely realised. Although the true incidence of the disease upon the visual nerve elements was

demonstrated many years ago (Bär, Groenouw, and Nelson), the macular fibres or cells are still often regarded as those primarily concerned. This misconception has led in the past to unjustifiable theories of causation and still produces much confusion of thought both in diagnosis and in aetiology. It cannot be too strongly emphasised that the macular elements, whether cells or fibres, are never either the first or the most severely affected, but are always involved after other elements of the papillo-macular bundle. If the scotoma in a case of moderate severity is carefully examined, the densest areas will be found near the blind spot, or between it and the fixation area, not at the fixation area itself. Only when the diffuse margin of the scotoma begins to invade the fixation area does the patient complain of symptoms, and indeed the scotoma may have existed and cleared up without the fixation area itself ever having been perceptibly affected. The scotoma of tobacco amblyopia is therefore not a central scotoma in the true sense, but a temporo-caecal defect which, by extending over the fixation area, becomes a centro-caecal scotoma." The diagnosis is not as a rule difficult. What the author has to say about chiasmal interference due to pituitary disease or other causes, and about Leber's disease had better be read in the original. When mentioning the good prognosis in most cases the author remarks that "cases in which serious visual incapacity remains appear to be rare in relation to the frequency of the disease."

The article includes two statistical tables and four charts. Eight references are given.

ERNEST THOMSON.

## BOOK NOTICES

**Saggi di Oftalmologia.** Vol. IV, 1928. Report from the Royal Ophthalmic Clinic of Rome under the direction of Prof. R. DI MARZIO. Pp. 638, with numerous illustrations. Tip. Pol. Cuore di Maria, Rome, 1929.

This collection of papers, edited by Prof. di Marzio, bears some resemblance to the Reports of the Royal London Ophthalmic Hospital now merged in this journal, in so far as it consists mainly of original papers contributed by workers in the clinic. The actual clinical work done is summed up at the end by Prof. di Marzio in some 25 pages. As an illustration of the amount of work covered we may note that no less than 129 cataract cases were operated on. As we propose to publish abstracts of the papers, a task facilitated by the fact that the authors have appended a summary of their

results in English, we need not enter into any detailed account of them in this notice. The comfort of the reader has been somewhat sacrificed to the excellence of the reproduction of the numerous text-illustrations by the use of a heavy and highly surfaced paper, but this discomfort has been reduced to a minimum by the excellent typography and wide spacing. Our Italian colleagues are to be congratulated in being able to supply so much original work in addition to the excellent journals with which our readers are familiar.

**Stillings pseudo-isochromatische Tafeln zur Prüfung des Farbensinnes.** 18th edition. Edited by Prof. Dr. E. HERTEL. Leipzig: Georg Thieme. 1920. Price M. 22.

The eighteenth edition of this very useful colour vision test, prepared by Prof. Hertel, does not differ greatly from its predecessors. Some of the previous plates have been omitted, and some new ones added. The new ones are plate XI with alternating colours in grey-green tones, plate XII with a more marked working out of confusion figures for defectives, plate XV worked out by Prof. Engelking as a result of his study of blue-yellow blindness, and finally, plate XVI in which the comparison of colours has to be made without any figures.

If we have a criticism to make it is that the figures are of rather unusual shape to English eyes.

Our readers are sufficienty familiar with the test in the previous editions, and we have no doubt will appreciate this latest rearrangement.

**Oftalmologia Para Medicos Practicos y Estudiantes.** By RAÚL ARGANARAZ. Pp. 813, with 357 figures. Buenos Aires: Libreria "El Ateneo."

Dr. Raúl Argañaraz, Professor of Ophthalmology in Buenos Aires, is already well known for his contributions to ophthalmology, especially with regard to the question of nystagmus and the subject of choroidal sarcoma. He has now provided Latin America with a text-book of ophthalmology specially written for students and practitioners. The book is based upon his lectures delivered in the Faculty of Medicine at Buenos Aires. It is eminently clinical, is large and comprehensive, well printed and profusely illustrated.

The arrangement of the subject matter follows conventional lines, and is divided into chapters, the majority of which comprise several lectures. Congenital deformities are dealt with first, and there follow under the headings of symptomatology, pathology, and treatment, the diseases of the various parts of the eye arranged regionally: the lids, lacrimal apparatus, conjunctiva, cornea, sclera, the orbit, iris,

ciliary body, intraocular tumours, and the lens. Each of these is dealt with in considerable detail, and it is interesting that in the majority of cases the common types of intraocular infections and the procedures recommended for their treatment are very similar to those prevalent in Western Europe. It is noteworthy that excision of the lacrymal sac is recommended rather than drainage operations into the nose. Conjunctivitis appears to be prevalent in South America and to assume severe forms, and the chapter on trachoma is interesting and well dealt with by the author.

The chapter on the disturbances of mobility of the eye is exhaustive; this subject is particularly well dealt with, and, as one would expect from the author, nystagmus receives more attention than it usually does in works of this kind. It is classified thus: labyrinthine, congenital, optical, cerebral, cerebellar, and miners' nystagmus. In the treatment of glaucoma, intra-venous hypertonic solutions are suggested as a means to relieve the tension prior to operation, and dionine is suggested as a useful drug as a miotic. The operative measure most highly recommended for the majority of cases is an iridectomy, and, as a second alternative, the trephine. The old-fashioned method of cataract extraction is preferred to the various intra-capsular procedures.

The remaining chapters deal with injuries to the eye, the vitreous, and amblyopias. Then follow descriptions of the routine clinical examination of patients, of refraction and the correction of the optical errors of the eye; while the last chapter deals with the examination of the fundus, and includes a description of diseases of the choroid, the retina and the optic nerve. It is in this chapter especially, as, indeed, throughout the book, that the reader feels the complete lack of coloured illustrations.

**Der Kopfschmerz und seine Behandlung.** By EUGEN POLLAK. Pp. 142 + Bibliography of 12 pages. Leipzig und Wien. FRANZ DEUTICKE. Price M. 9.

Pollak's treatise on headaches and their treatment is an excellent compilation with defects on the same generous scale. The author's approach to the subject may appear roundabout, but is nevertheless sound: to discuss the conditions in which headache is but a symptom may not be of much use in the treatment of that large class of headaches of no apparent cause, but is of value in getting a clearer view of the mechanism underlying headaches in general. This is the strength of the monograph: clearly defined conditions, such as the headaches of infectious fevers, chronic infections, intoxications, vascular disturbances and the late headaches from cranial trauma are discussed among others, and the attempt is made to translate the multitude of causes into terms of pathological changes in the brain, its coverings or bloodvessels. The ordered mass of

information in this book may not always be convincing or devoid of ambiguity, but these faults are the faults of the quality of the work.

Still if the monograph is as good as it can be on the pathological side it is disappointing in its main object—that of supplying guidance on the treatment of headaches. The treatment of the symptomatic headache is obvious enough, but it is a fact that most headaches have no clear association with any gross disturbance, and on this subject the author appears to have but little to say. He does not seem to have learnt the lesson that Weir Mitchell taught on the relationship of eyestrain and headaches. The eye is indeed discussed as one of the possible sources of headaches, but in agreement with the whole plan of the book pride of place is given to gross organic lesions like glaucoma and iritis. Heterophoria is discussed but refractive errors are dismissed in two sentences. A good account of migraine is marred by the omission of any reference to the eye as the possible source of trouble. From the point of view of treatment these are by no means minor faults. Co-operation with an oculist would have made the author's work more balanced, and incidentally he would have learnt not to attempt to diagnose acute glaucoma from fundus appearances.

## CORRESPONDENCE

*To the Editor of* THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIR,—While engaged recently in making an English translation of the *De Oculis* of Benevenutus Grassus, the first printed monograph on the eye and its diseases (Ferrard 1474), I tried to locate all existing copies of that extremely rare little book.

Three copies in America and four in Continental Europe completed the census so far taken, but it seemed to me that there *must be* others, especially in Great Britain, whence came two of our examples. Aided by Mr. R. R. James and Dr. Charles Singer, I sent a questionnaire to the principal libraries of this country, but without result. Quite recently, however, I received a note from Mr. S. Wood, Library Assistant of the Royal College of Surgeons, informing me that there is a copy on the shelves of their library.

Through the courtesy of the officials I have been able to collate the volume, and was much pleased to note that it is a fine copy in a good state of preservation—an exact replica of each of the American trio. It is Pinelli's own copy, having been listed in his catalogue, and there are annotations copied on the *recto* of the first blank leaf. Neither the initials nor lines are rubricated but there are many marginal notes in red ink. It was purchased for the

College Library at the Riggal's Library sale in 1902, thus making the eighth of the known copies of the work.

Mr. Wood drew my attention to a reference previously unknown to me, a " Review of the First Book on Diseases of the Eye by Benevenutus Grassus," by Fred. P. Henry, Hon Librarian of the College of Physicians, Philadelphia, published in the *Med. Library and Histor. Journal,* New York, 1909, p.29, in which a brief history of this remarkable treatise is correctly given.

Yours truly,

CASEY A. WOOD.

LONDON,
*July* 12, 1929.

## NOTES

**Death**

WE regret to record the death of Hugh Campbell Highet, M.D., D.P.H., on July 29, 1929. Born in 1866, and educated in Scotland, most of his professional career was spent in the Far East, where he held appointments in Siam and Bangkok. He retired from Siam in 1919 and settled in Winchester, where he rapidly achieved success as an ophthalmic surgeon.

* * * *

**Presentation to Dr. Ernst Fuchs**

NEW YORK CITY, July 29. In recognition of " the most outstanding achievement in the prevention of blindness and the conservation of vision," Dr. Ernst Fuchs, of Vienna, will be awarded the Leslie Dana Gold Medal. The presentation will be made at the International Ophthalmological Congress in Amsterdam, Holland, September 10, by Dr. William H. Luedde, of St. Louis, director of the Prevention of Blindness Department of the Missouri Association for the Blind, through which the medal is offered annually by Mr. Leslie Dana, also of St. Louis.

" In selecting Dr. Fuchs, there was a departure for the first time from the usual custom of considering only Americans for this honour," said Mr. Carris, Director of the National Society for the Prevention of Blindness of New York. " Dr. Fuchs charted the way for all prevention of blindness work accomplished throughout the world in the last 45 years; he did this when he won the prize at the Fifth International Congress for Hygiene at the Hague in 1884 with his essay on ' The Causes and Prevention of Blindness.' Dr. Fuchs was a professor of ophthalmology in the University of Liège at that time; he has been distinguished in his profession for more than half a century."

**Prevention of Blindness**

THE subject of prevention of blindness is now receiving attention from numerous quarters throughout the world, according to Mr. Carris, such as the Child Welfare Committee and the Health Committee of the League of Nations, the League of Red Cross Societies, the International Ophthalmological Congress, the International Labour Office, and others. A conference of all the forces engaged in the work of preventing blindness and conserving vision in America will be held in St. Louis, Mo., November 11-13. This conference will be attended by public health officials, ophthalmologists, safety engineers, illuminating engineers, educationists, research workers, social workers and others.

* * * *

**Braille**

THIS year is the centenary of the invention of Braille, an invention that has meant a new world to many of the blind. It is not generally known that the inventor was a young musician, Louis Braille, born at Couvray near Paris in 1809, who became blind at the age of three years, and first published his famous system of raised dots in 1829, fully developing it five years later.

* * * *

**D.O.M.S.**

THE following were the successful candidates at the last examination for the D.O.M.S.:—Agnes L. Adam, B. Alexander, P. K. Banerjea, W. A. Briggs, R. D. W. Butler, S. N. Cooper, V. A. P. Costobadie, T. Edmunds, Julia M. Fleming, A. A. Gibbons, S. L. Geerin, I. C. Fraser, J. R. McClean, N. Manson, R. S. Marya, M. D. Nunan, P. Pattabhiramaiya, A. M. Ponnambalam, C. S. V. Ramanan, K. Sen, L. B. Somerville-Large, B. R. Tandan, M. Tree, T. K. Uttam Singh, D. G. Vyas, and G. B. White.

## FUTURE ARRANGEMENTS

### 1929

*September* 5-13.—**International Congress of Ophthalmology at Amsterdam.**

*October* 18.—North of England Ophthalmological Society, at Manchester.

*November* 15.—North of England Ophthalmological Society, at Bradford.

*December* 6.—North of England Ophthalmological Society, at Leeds.

**1930**

*January* 17.—North of England Ophthalmological Society, address by Professor Van der Hoeve at Sheffield. Subject: "X-ray Diagnosis in Ophthalmology."

*January* 20.—North of England Ophthalmological Society, address by Professor Van der Hoeve at Leeds. Subject: "Strabismus."

*January* 21.—North of England Ophthalmological Society, address by Professor Van der Hoeve at Manchester. Subject: "Tumours and Pseudo-Tumours of the Eye and Orbit."

*February* 7.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

*March* 7.—North of England Ophthalmological Society, at Liverpool.

*March* 28.—North of England Ophthalmological Society, at Sheffield.

## CONTEMPORARY OPHTHALMIC LITERATURE

### American Journal of Ophthalmology. *July, 1929.*

GRADLE. Heterochromia iridis with cyclitis and cataract.
CORDES and HORNER. Infantile amaurotic family idiocy in two Japanese families.
LEBENSOHN. Oculovisceral reflexes.
RUTHERFORD. Complications in cataract extraction.
EWING. Office training in ophthalmology.
HILL. Defects in ophthalmologic training.
MORTON. Rotation planes in facial asymmetry.

### Annales d'Oculistique. *June, 1929.*

GALLEMAERTS and GAUTHIER. Multiple cysts of the iris.
MAGITOT. The symptomatology of glaucoma and the problem of pathogenesis.
TERSON. The utilisation of the muscular insertions on the globe for the purpose of radiographic localisation.
POTIQUET. On the results of plastic dacryocystorhinostomy.

### Archives d'Ophtalmologie. *June, 1929.*

DUVERGER. Ectropion and senile entropion.
TERRIEN and VEIL. On certain so-called primary glaucomas.
SCHAEFFER and BLUM. Parinaud's syndrome.
CHARAMIS. On a case of hydatid cyst of the orbit.
ADAMANTIADÈS. Hydatid cyst of the orbit. Perforation of the orbit and exit of the cyst by the nostril.
RAGAIN. Treatment of trachoma by high frequency.

### Revue d'Optique. *March, 1929.*

HAAS. The size of the images of an object at infinite distance in various conditions of static refraction and notably in corrected ametropes.
JAUSSERAN. On the evolution of the latent image.

## Archiv für Augenheilkunde. *July, 1929.*

ZEEMANN. On fixation and optical eye movements.
SCHAPPERT-KIMMYSER and HOUWER. Melanomata and the smallest sarcomata.
SCHAPPERT-KIMMYSER. The frequency of so-called uveal melanomata in eyes with or without sarcoma.
FRANCESCHETTI and HALLAUER. The transference of antibodies into the intra-ocular and cerebro-spinal fluids and the effects of Theophyllin thereon.
HALLAUER and FRANCESCHETTI. The transference of antibodies into the aqueous humor and its relationship to conditions of solubility.
MÜLLER and PFLIMLIN. On the influence of the sympathetic in the albumen content of the aqueous.
GREEF. On the aetiology of detachment of the retina.
KLEIBER. The effect of local application of salt solutions of calcium, magnesium and strontium on animals' eyes.
LEVINSOHN. On the anatomy of the eye of the artifically myopic ape and its meaning in the genesis of myopia.
JUNIUS. Tuberculoma of the bulbar conjunctiva.
DE DECKER. On the influence of the increase of plasma on the normal intraocular tension.
SCHMIDT. Clinical and experimental studies on local and general disturbance of vessels in glaucoma simplex.
DE DECKER. On the connection of detached retina with general and local disturbance of capillaries.
GRÓSZ. On sarcoma of the uvea.
FLEISCHER. On the aetiology of conical cornea.
SCHMELZER. On the question of familial detachment of the retina.
THADEN. A case of arachnodactily with special reference to the eye symptoms.
BERKERT. On the affection of women by hereditary optic atrophy (Leber's disease)
SEISSIGER. Ocular findings in the newborn.
KÜMMELL. On the anatomy of detachment of the retina.
GILBERT. On xanthomatosis of the cornea and skin.
SEEFELDER. On the pathological anatomy of retinitis circinata together with an observation on the question of the origin of so-called fat nucleated cells (Fettkörnchenzellen).
GASTEIGER. On the therapeutic use of X-rays in ophthalmology.
LÖHLEIN Research into the wandering of pigment in the epithelial layer of the cornea.
ERGGELET. Photographs of the fundus oculi.
VOM HOFE. Clinical observations on glaucomatous cupping without rise of tension.
SPYROPOULOS. Experimental proof of the bactericidal action of thorium X in solution and in ointment on certain ocular pathogenic organisms *in vitro*.
HEINE. On the ocular indications for interruption of pregnancy and sterilization.
HERTEL. On the meaning of Erlich's fluorescin investigation.
YOSHIDA. On the inter relations between blood and aqueous.
FISCHER. On the permeability of the cornea and on *intra vitam* staining of the anterior portion of the globe, with reference to *intra vitam* staining of the choroidal plexus.
WESSELY. On the value of Avertin narcosis in ophthalmology.
PASSOW. On ophthalmological experience of X-ray treatment of intracranial neoplasms (excluding pituitary tumours).
MARCHESANI. Sympathetic ophthalmitis in the light of experimental researches.
HEESCH. The anatomy of the vitreous.
CREMER. Calcium therapy in phlyctenular disease.
ZENKER. Comparative investigations into the practical value of the modern refractometer.
KNAPP. On the technique of Krönlein's operation.
ELSCHNIG. On the zonular lamella.
LIEBITSKY. On our knowledge of congenital iris anomalies. Aplasia semicircularis iridis circumpupillaris.

BRAUN. The treatment of experimental tuberculosis of the iris with ultra-violet light.
WEVE. The treatment of syphilitic interstitial keratitis.
LOHMANN. Conus temporalis inversus.
SCHIECK. On the special risk to the region of the posterior pole in diseases of metabolism and of the circulatory system.
KYRIELEIS "Albuminuric retinitis" without ophthalmoscopic findings.
RIEHM. Acute pigmentary degeneration of the retina after poisoning with "Septojod."

## Archiv für Ophthalmologie. *July, 1929.*

FUCHS. On the ciliary vessels.
CAR AND ORTYNSKI. Experimental researches on the action of extracts of ductless glands on the regeneration of the aqueous.
TOWBIN AND PROSOROWSKI. On the pathogenesis of interstitial keratitis and its connection with the endocrine system.
ROHRSCHNEIDER. Experimental researches on the changes in the normal ocular tissues after exposure to X-rays. Part 3. Changes in the lens, the retina, and the optic nerve.
ARNOLD. Further contributions to our knowledge of cystoid macular degeneration. (Honeycomb choroiditis; with observations on the technique of red-free light).
VONTOBEL. Observations on the inheritance of myopic degeneration of the fundus.
BEELER. On heterotypical conus, especially inferior conus, and the ectasia of the neighbouring portion of the fundus.
DEUTSCHMANN. Tears in the retina, especially their meaning in detachment.

## Klinische Monatsblätter für Augenheilkunde. *June, 1929.*

WIBAUT. Experiences of trachoma in Amsterdam.
BOENTE. Metastatic melanoblastoma of the retina.
BIETTI, Jun. Histological investigations and technical observations on tattooing of the cornea with platino-chloride, silver nitrate and gold chloride + silver nitrate.
LIPSCHÜTZ. On the meaning of hydrogen ion concentration in the conjunctival sac.
COLDEN. Symonds' disease (dystrophia cachectico-genitalis) with ocular changes.
SCHÖPFER. On neurotrophic increase of growth of the eyelashes in neuroparalytic keratitis.
SZOKOLIK. On the vomiting (Aschnersch's symptom) and its treatment in tense haemorrhage into the orbit.
APIN. The Fick-Livschitz tonometer and its trial.
LÖWENSTEIN Clinical, histological and therapeutic observations on lattice keratitis (gitterformigen Hornhautdegeneration.)
LITINSKY. On paradoxical squint.
REUSCHER. Inflammation of the lids from working with teak.
WEINTRAUB. A case of uncircumscribed transitory oedema of the macula.
GOLDFEDER. A new procedure—auricular cartilage tarsal implant—for treatment of trachomatous entropion.
WÖLFFLIN. On a new protective goggle for X-ray workers.
CSAPODY. The making of moulds of the superficial surface of the living eye in the prescribing of contact glasses.
THIES. Severe dazzling from luminious and ultra-violet rays.
BRONS. On the extension of accident insurance to occupational diseases.
STREIFF. On the advantage of a single armed spectacle.
GLIKSON. Tumour of the hypophysis with pressure on the chiasma and its treatment with novasurol.
ISAKOWITZ. On the bacteriological prophylaxis in cataract operations
RAUBITSCHEK. Remark on the article of Prof. Vogt, entitled "Investigation of the origin of the pigment ring in Descemet's membrane in pseudo-sclerosis."

*July, 1929.*

HOLTH. Subjective kinematoscopy.
WIEDERSHEIM. On the technique of the optical reproduction of the mechanism of nystagmus.
APIN. On the principle of applanation in tonometry in the light of manometric investigation.
PETERS Ocular metastasis in red murrain in pigs.
SCHÖPFER. Contributions to our knowledge of metastatic tuberculous ophthalmia.
FEIGENBAUM. Lenticonus anterior.
RAUH. Bilateral cataracta pulverulenta with neighbouring symmetrical opacities.
KNAPP. Further investigations on tattooing.
JESS. Cilia incarnata totalis.
TONTSCHEFF. The treatment of spring catarrh with lactic acid.
ABE. On the question of paresis of accommodation in so-called retinitis centralis.
RAUH. Disc shaped changes in the choroid in the macular region in high myopia.
LÊNÁRD. A modification in the procedure of cyclodialysis.
GOEBEL. The temporary drainage of the lacrimal passages and its results in purulent inflammation of the sac.
LÉNÁRD. Is a preliminary canthotomy necessary in cataract operation on an enophthalmic eye?
AXENFELD. On canthotomy in cataract operation.
VANNAS. A modification of canthotomy.
AWGUSCHEWITSCH. Elephantiasis of the upper lid, facial hemihypertrophy and hydrophthalmia with enlargement of the sella turcica on the same side.
MEHLHOSE. The blood sugar content of cataract patients.
WISSELINK. On trophic vasomotor disturbance of the corneal epithelium.
MEYERHOF. On a newly discovered antique convex lens.
KIEL. On a unique case of cerebral tumour.

## Zeitschrift für Augenheilkunde. *July, 1929.*

JUNIUS. Observations on the clinical picture in "Retinitis" (Coats), in "Retinal degeneration with multiple aneurysms" (Th. Leber) and in so-called "Angiomatosis retinae" (Czermak-von Hippel).
MANDICEVSKI. On a peculiar form of chalk deposit in the eye.
RIEGER and TRAUNER. On a case of the Biedl-Bardesch syndrome and the conditions of its inheritance.
KRAUSE. Naevus flammeus and glaucoma.
SOMMER. On the histological findings in a case of deep keratitis.

## Annali di Ottalmologia e Clinica Oculistica. *April-May, 1929.*

MAGGIORE. On the functional value of each segment.
TESSIER. Behaviour of the iris and of the intra-ocular pressure.
PANICO. Contributions to the study of experimental tuberculosis of the cornea.
LODDONI. Ocular calcification—"Calcification of the cornea."
FAVALORO. Researches in clinical morphology and affections of the optic tracts.
CANDIAN. A case of neurinoma and of racemose neuroma of the upper lid.
MARGOTTA. Primary melano-sarcoma of the lacrimal sac.
BARLETTA. Perithelioma of the limbus.

## Archivio di Ottalmologia. *May, 1929.*

ANGELUCCI. New forms of energy, the protection of the eye and of general health in workshops, offices and schools.
BALDINO. The results of Tracolisina in my professional practice.
ROSSI, On perception.
SALVATI. Modern Italian treatment of trachoma and its corneal complications.

## Bollettino d'Oculistica. *June, 1929.*

VOLLARO. On a personal method of simplified dacryocystorhinostomy, a modification of the fundamental method of Toti.
BENCINI. Contributions to the study of the changes in the lens in dystrophia myotonica.

ACCARDI. The fatty substance in septic endophthalmitis.
SERRA. A chip of stone in the iris.
MENESTRINA. Functional non-concomitant strabismus.

*July, 1929.*

GENNARO. Clinical research on phlyctenular kerato-conjunctivitis in connection with the morphological constitution and of the neuro-vegetative endocrine system.
ALIQUO-MAZZEI. On Purtscher's disease of the retina.
MENESTRINA. Contribution to the study of plastic operations on the lids.
BENCINI. Disciform keratitis (Fuchs) and the herpetic virus.
TIRELLI. The determination of vision in ocular accidents.

**Lettura Oftalmologica.** *January, 1929.*

AGNELLO. Clinical contribution to ocular traumatology (retention of foreign body, sympathetic irritation and traumatic aniridia.)
CANITANO. Theory and practice of skiascopy.

*February, 1929.*

CANITANO. Theory and practice of skiascopy. *(Continued)*
LODDONI. The presence of cholesterin crystals in the anterior chamber.
SALVATI. Endocrine insufficiency in the pathogenesis of senile cataract and its treatment by hormones.
ADINOLFI. Glaucoma in an eye with aniridia.

*March, 1929.*

CANITANO. Theory and practice of skiascopy. *(Conclusion.)*
TESSIER. Accidental vaccinia inoculation.

*April, 1929.*

GIANNANTONI. Primary epithelioma of the bulbar conjunctiva in an eye with a congenital malformation.
STILO. Melanosarcoma of the choroid.
LA FERLA. On a treatment of trachomatous xerophthalmia and of corneal xerophthalmia following burns.

*May, 1929.*

GIANNANTONI. Metastatic ophthalmitis following osteomyelitis.
BIALETTI. Review of the pathogenesis and treatment of detachment of the retina.

*June, 1929.*

BAQUIS. On the surgical cure of high myopia.
TESSIER. Peribulbar epithelioma.
MAZZOLA. A case of petrifying conjunctivitis.
MAZZOLA. A rare case of haemopis cavallina attacking the limbus.

**Archivos de Oftalmologia de Buenos Aires.** *April, 1929.*

BARRIÈRE. Disciform degeneration of the central region of the retina.
BALADO, ADROGUE AND FRANKE. Contribution to the anatomical study of quadrantic hemianopia.
MANES. Is the blue of the sky subjective?

**Archivos de Oftalmologia Hispano-Americanos.** *July, 1929.*

LUQUE. Clinical aspect of glaucoma in youth, maturity and old age.
DEL BARRIO. Clinical study of treatment of concomitant squint.

**Revista Cubana de Oftalmologia y Oto-Rino-Laringologia.**

*May, 1929.*

VIONDI. Treatment of spasmodic entropion by modern methods.
RIVERO. Contribution to the study of the localisation of cerebral tumour by the method of ventriculography.

**Revista Oto-Neuro-Oftalmologica y de Cirurgia Neurologica.**

*June, 1929.*

EHLERS. On the pathogenesis of ophthalmoplegic migraine.